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July 30, 2004

Michael Sciafani, Wetlands Council Clerk
Department of Environmental Services
6 Hazen Drive
PO Box 95
Concord, NH 03302-0095

RECEIVED

JUL 30 2004

04-15 WC

Re: Town of Nottingham Selectmen's Notice of Appeal

Dear Mr. Sciafani:

Enclosed for filing with the Water Council, please find an original and twenty (20) copies of the Notice of Appeal.

Thank you for your attention in this matter.

Very truly yours,
COPY


E. Tupper Kinder

ETK/sma
Encls.

cc: Michael Nolin, Department of Environmental Services
Harry Stewart, Department of Environmental Services
Mark E. Beliveau, Esquire
Richard W. Head, Esquire
Armand M. Hyatt, Esquire
Town of Nottingham
Anthony Soltani, Esquire

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The State of New Hampshire
Department of Environmental Services
Water Council

In Re: Application of USA Springs, Inc. for a Large Groundwater Withdrawal Permit and
Approval of Bottled Water Source

SELECTMEN OF THE TOWN OF NOTTINGHAM'S NOTICE OF APPEAL

The Town of Nottingham Selectmen hereby appeal to the Water Council the Decision of the Department of Environmental Services Water Division to grant a large groundwater withdrawal permit to USA Springs, Inc. The Department issued its decision July 1, 2004.

Under the provisions of RSA 21-O:7,

"The Water Council shall hear and decide all appeals from department decisions relative to the functions and responsibilities of the division of water other than department decisions made under RSA 482-A relative to wetlands, in accordance with RSA 21-O:14."

Under RSA 21-O:14, hearings before the Water Council shall be conducted in accordance with the provisions of RSA 541-A, governing adjudicative proceedings. Appeals from decisions of the Water Council are in accordance with the provisions of RSA 541.

The review of applications for large groundwater withdrawals is a function and responsibility of the division of water. Thus, the provisions of RSA 21-O:7 mandate that the Water Council hear this appeal. The conduct of an adjudicative proceeding before the Water Council under RSA 21-O:7 is consistent with the provisions of RSA 485-C:21 and regulation of the Department which provides that appeals from decisions on large groundwater withdrawal permit applications are to be conducted in accordance with RSA 541. Following the decision of the Water Council, an aggrieved party may appeal under the provisions of RSA 541 to the New Hampshire Supreme Court.

This appeal to the Water Council is based upon the reasons set forth in Nottingham's Motion for An Adjudicatory Hearing dated July 20, 2004. (Attachment A) and its Motion for Rehearing dated July 30, 2004 (Attachment B). In accordance with Env-Wc 203.03, a copy of the decision of the Department is attached here to as Attachment C. A copy of the Notice of Appeal has been forwarded to the Director of the Water Division and to the Commissioner of the Department.

Respectfully submitted,
TOWN OF NOTTINGHAM SELECTMEN

By its attorneys,
Nelson, Kinder, Mosseau & Saturley, P.C.

COPY

Dated: July 30, 2004

E. Tupper Kinder, Esquire
99 Middle Street
Manchester, NH 03101
Tel. (603) 647-1800

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing have been mailed, first class, and postage prepaid Michael Nolin, NHDES, Harry Stewart, NHDES, Mark Beliveau, Esquire, Armand Hyatt, Anthony Soltani, Esquire, and Assistant Attorney General Richard Head.

COPY

E. Tupper Kinder, Esquire

Attachment A

7/26/04

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF ENVIRONMENTAL SERVICES
WATER DIVISION

In Re: Application of USA Springs, Inc. for a Large Groundwater Withdrawal Permit No. LGWP 2004-0003 and Application on Approval of Bottled Water Source

MOTION FOR ADJUDICATIVE HEARING UNDER RSA 541-A:31

The Town of Nottingham Selectmen, acting on behalf of the citizens of the Town of Nottingham for the purpose of protecting public resources and interests and the Town, hereby request an adjudicative hearing under RSA 541-A:31 and in support thereof states as follows:

1. On July 1, 2004, DES granted a large groundwater withdrawal permit to USA Springs, Inc. This action followed hearings held to receive public comment and other review conducted under the provisions of RSA 485-C:1, 21 and regulations promulgated thereunder. See Env-Ws 388. The Town of Nottingham Selectmen participated in these proceedings in opposition to the granting of the permit because of the extent of the proposed withdrawal. The permit suggests that citizens of Nottingham residing within 7,000 feet of the USA Springs wells, an area 3 miles across, may be affected by the grant of this permit. Large Groundwater Withdrawal Permit 2004-003 at 5.

2. RSA 485-C:21 provides that a municipality may submit comments and that the Department shall specifically consider the recommendations of the municipality. (RSA 485-C:21(V)). This language provides affected municipalities with a status equivalent to that of a party entitled to notice and opportunity to be heard. The number of private citizens of Nottingham affected is extensive.

3. RSA 541-A:31, I provides that:

“an agency shall commence an adjudicative hearing if a matter has reached a stage at which it is considered a contested case or if the matter is one for which a provision of law

requires a hearing only upon the request of a party, upon the request of a party.”

Use of the word “shall” indicates that this is non-discretionary. Accordingly, the Town of Nottingham Selectmen are entitled to a 541-A:31 adjudicative proceeding under RSA 541-A:3(I) because this matter has become a contested case as that term is recognized under New Hampshire Law since it is a proceeding in which the legal rights, duties or privileges of a party are required to be determined by an agency after notice and an opportunity to be heard. (RSA 541-A:1(IV)). As declared by RSA 485C:1, groundwater in the Town of Nottingham is a local resource upon which the Town and its citizens rely for their viability.

4. Further, the Town of Nottingham Selectmen are also entitled to an adjudicative proceeding under RSA 541-A:31(I) because this is a matter in which a hearing must be provided upon the request of a party. Env-Ws 388.23 provides that:

“The Department shall provide the applicant with an opportunity for a hearing in accordance with RSA 541-A:31 if the permit is denied.”

Although the regulation does not specify that persons directly affected by the grant of a permit are entitled to an adjudicatory proceeding, the regulation would violate principles of due process and equal protection unless it is interpreted to also allow access to an adjudicatory proceeding to persons aggrieved by the grant of a permit.

Under Env-Ws 388.23, this request for an adjudicatory proceeding is timely because the DES regulations recognize that following the Department’s initial determination to grant or deny a permit, the matter becomes a contested case to which the provisions of RSA 541-A:31 are applicable.

5. The Town of Nottingham Selectmen are also entitled to an adjudicative proceeding under the provisions of RSA 541-A:31(II), which provides DES with the discretion to hold such proceeding, because an adjudicative proceeding is necessary for the proper adjudication of this matter.

RSA 481:1 declares that the policy of this State is that:

"The general court finds that an adequate supply of water is indispensable to the health, welfare and safety of the people of the state and is essential to the balance of the natural environment of the state. Further, the water resources of the state are subject to an ever-increasing demand for new and competing users. The general court declares and determines that the water of New Hampshire whether located above or below ground constitutes a limited and, therefore, precious and invaluable public resource which should be protected, conserved and managed in the interest of present and future generations. The state as trustee of this resource for the public benefit declares that it has the authority and responsibility to provide careful stewardship over all the waters lying within its boundaries. The maximum public benefit shall be sought, including the assurance of health and safety, the enhancement of ecological and aesthetic values, and the overall economic, recreational and social well being of the people of the state ..., all levels of government ... shall comply with this policy" (emphasis supplied)

RSA 485-C:1(II) declares that it is the policy of the State that:

"... because groundwater is primarily a local resource, cities and towns should have the first opportunity to institute programs for groundwater protection within the scope of this chapter. The state, which has general responsibility for groundwater management in the public trust and interest, should develop groundwater protection programs within the scope of this chapter when such programs are not developed by a local entity". (emphasis supplied)

6. The Town of Nottingham Selectmen assert that the public comment process has not been sufficient to enable DES to properly act on this matter as envisioned by its responsibilities under RSA 481:1 and RSA 485-C:1. As a result, the Town of Nottingham Selectmen believe that DES has failed to recognize and appreciate the facts contained in the record of these public comment proceedings and that an adjudicatory proceeding would result in

an improved opportunity for the Department to consider the USA Springs large groundwater withdrawal permit application in the context of the law and regulations and the technical information contained in the record.

7. Specifically, the Town of Nottingham Selectmen believe that an adjudicative proceeding would provide an improved opportunity for a final decision based upon the following considerations:

- a. Although DES is charged with protecting the public groundwater resource to the maximum public benefit, it has misperceived its duty and granted a permit which is unsupported by the data generated by the applicant and which puts the public resource at risk protected only by the ability of the Department to enforce conditions after adverse impacts are identified.
- b. The state of the record demonstrates that neither DES nor the applicant have correct and complete information regarding the source of the water to be extracted or the sustainability of extraction of the quantity requested. DES has found that the applicant's information in this regard is incomplete and contradictory, and DES has not developed its own data to support granting of the permit. For example, the Department has found that after partial dewatering of the aquifer, water levels will stabilize and continuous dewatering will not occur. There is no data supporting this position. The Department concedes that the applicant never reconciled its contradictory presentations of the conceptual hydrologic model. An

adjudicatory proceeding will assist DES in evaluating the data relating to recharge and groundwater flow issues.

- c. DES has proposed to issue a permit for a groundwater withdrawal which is intended to serve as a source of bottled water where the data demonstrates that the source water is currently contaminated. There is no public interest reason to issue a large groundwater permit with contamination, which will be adversely affected, in place. An adjudicatory hearing will show how such action does not maximize public benefits.
- d. DES has failed to consider the impact of the issuance of this permit on future use even though the declared policy of the state requires it to do so. In fact, the DES decision to issue a conditional permit to take place perhaps 5 years in the future without considering future uses is directly contrary to this policy. DES has not appreciated how changing conditions in the source water area, which is undergoing significant development and increasing demands on water use, may alter the results of the pumping test conducted in November 2002. Maximizing the public benefit requires not granting the permit until the withdrawal is to be implemented.
- e. The record reflects that DES has failed to adequately consider the expert opinion of its own consultant, ENSR, which was highly critical of the applicant's report. ENSR noted:

"For example, the conceptual model is not fully developed and

integrated, especially regarding bedrock. Internal consistencies, unclear explanations of minor faulting and lack of illustration cast doubt on the Report's forecast. ENSR Report, March 19, 2003 at 16."

An adjudication hearing would assist DES in evaluating that relying on incomplete and incorrect information is not in the public benefit.

- f. The Department has failed to adequately consider its duty to protect prime wetlands under RSA 482-A:11(V) which provides:

"The Department shall not grant a permit with respect to any activity proposed to be undertaken in or adjacent to an area mapped, designated and filed as a prime wetland ... unless the Department is able, specifically, to find clear and convincing evidence on the basis of all information considered by the Department and after public hearing that the proposed activity, either alone or in conjunction with other human activity, will not result in significant net loss of any of the values set forth in RSA 482-A:1."

Even the DES consultant, ENSR, found:

"The leakage analysis [of the applicant] is flawed and not based on conservative assumptions. Therefore, the conclusion of no adverse impact on wetlands is poorly founded." ENSR Report, March 19, 2003 at 16.

An adjudicative hearing would assist DES in evaluating these facts.

- g. The Department has issued a permit despite the absence of any data indicating that the extraction volume is sustainable and in the face of un-rebutted evidence that the extraction is not sustainable. The data show that the pumping wells did not stabilize during the pumping test and that no significant recharge occurred during this test. DES has failed to

adequately consider the expert testimony of Professor Thomas P. Ballesterio, and has failed to appreciate that his testimony that the withdrawal amount requested is not sustainable, deemed not relevant by DES, is consistent with the generally accepted principles within the field of groundwater hydrology and is entirely relevant and applicable. An adjudicative hearing will assist DES in understanding the applicability of these principles.

- h. DES has exceeded its authority, delegated to it from the legislature under RSA 485-C:1, by issuing a "conditional permit" which the Department recognizes cannot be implemented for a period which may exceed 5 years into the future. This exceeds the DES authority and violates its own regulations because it attempts to commit for private future use the public groundwater resource without balancing the interests of other competing future users.
- i. DES has mistakenly relied on the ability of a proposed monitoring scheme to detect adverse impacts and upon DES' own ability to timely enforce orders to the applicant to reduce or cease its extraction operations. DES view that a porous media model does not apply to the site, if accepted, leads to the inescapable conclusion that monitoring at discrete locations may not disclose adverse impacts. An adjudicative hearing would assist DES in balancing the limitations of a monitoring scheme with the public

interest.

- j. DES has failed to provide permit conditions which are protective of the public interests identified in RSA 481:1 and RSA 485-C:1 and which are enforceable. For example, DES assumes that monitoring data will provide clear answers to whether and to what extent adverse effects are occurring. In fact, monitoring results are likely to be ambiguous leading to disagreements and disputes as to the nature and extent of adverse impacts. Such an approach does not maximize the public benefit. An adjudicative hearing would assist DES in evaluating the limitations of its permit conditions.

8. DES, which under RSA 481:1 has been directed to regulate and manage large groundwater withdrawals for "maximum public benefit" has unlawfully and unreasonably granted a permit to a private party to extract a public resource without requiring a documentation that the extraction is sustainable. DES found in denying the application on August 12, 2003

"Understanding the origin of water derived from a pumped well and its relationship to aquifer recharge, storage, and ultimately natural discharge is required by Env-W 388206(1) and 388.14 and is [a] fundamental element of an analysis to determine if the proposal is sustainable and will result in an adverse impact..."

Nevertheless, DES has granted a permit in the absence of supporting data based solely on the inclusion of conditions which are untested and of uncertain enforceability. An adjudicative hearing would assist DES in resolving this inconsistency.

9. In conclusion, the Town of Nottingham Selectmen assert that an adjudicative proceeding will allow for a fair and thorough evaluation of the above issues which have not been appreciated by DES. The proceeding will provide a context which will lead to a decision which is fair to the applicant, protective of the public interest and permit a better decision for review should any aggrieved party wish to exercise their rights of appeal.

10. The conduct of an adjudicative proceeding will not be prejudicial to the applicant or any other party because it is recognized that the large groundwater withdrawal permit, by its own terms, cannot be implemented for what is estimated to be at least several years into the future.

11. The Town of Nottingham Selectmen will also be filing in the alternative, a motion for rehearing in accordance with the provision of RSA 485c and RSA 541.

Wherefore, the Town of Nottingham Selectmen respectfully request that the Department grant this Motion for an Adjudicative Hearing under the provisions of RSA 485-C and regulations promulgated thereunder Env WS 358.23 and the provisions of RSA 541-A:31.

Respectfully submitted,
TOWN OF NOTTINGHAM SELECTMEN
By its attorneys,
Nelson, Kinder, Mosseau & Saturley, P.C.

Dated: July 20, 2004

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E. Tupper Kinder, Esquire
99 Middle Street
Manchester, NH 03101
Tel. (603) 647-1800

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing have been mailed, first class, and postage prepaid to the parties indicated on my service list.

COPY
E. Tupper Kinder, Esquire

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Attachment B

**NELSON
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Kristin M. Yasenka

* Admitted in MA only
** Admitted in ME only

July 30, 2004

Commissioner Michael P. Nolin
NH Department of Environmental Services
Box 95, 29 Hazen Drive
Concord, N.H. 03302-0095

Re: USA Springs Large Groundwater Withdrawal Permit – No. LGWP 2004-0003

Dear Commissioner Nolin:

Please find enclosed the *Town of Nottingham Selectmen's Motion for Rehearing* regarding the above-referenced matter.

Thank you for your attention to this matter.

Very truly yours,



ETK/sma

Encl.

cc: Harry Stewart, Department of Environmental Services
Mark E. Beliveau, Esquire
Richard W. Head, Esquire
Armand M. Hyatt, Esquire
Town of Nottingham
Anthony Soltani, Esquire

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THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF ENVIRONMENTAL SERVICES
WATER DIVISION

In Re: Application of USA Springs, Inc. for a Large Groundwater Withdrawal Permit and
Bottled Water Source

TOWN OF NOTTINGHAM SELECTMEN'S REQUEST FOR REHEARING

Introduction

The Town of Nottingham Selectmen (hereinafter "Nottingham"), acting on behalf of the citizens of the Town of Nottingham for the purpose of protecting public resources and interests, request a rehearing of the decision made by the New Hampshire Department of Environmental Services dated July 1, 2004 which conditionally grants the application of USA Springs, Inc. for a large groundwater withdrawal permit under Env-Ws 388.

This decision authorizes USA Springs, at some point perhaps 5 to 10 years in the future, to begin withdrawing 307,000 gallons per day from a bedrock aquifer. This amounts to 113.0 million gallons per year, nearly as much as is used by the entire current population of Nottingham. Significantly, most of the water used by Nottingham residents is returned to the aquifer, where none of that extracted by USA Springs will be. Further, its withdrawal is an order of magnitude higher than any other bottled water source and is significantly more than all other water bottlers in the State of New Hampshire combined. The pumping test demonstrated "more total impacts and more impacts over a greater distance" than occurred for any similar groundwater withdrawal reviewed by DES. (DES Decision December 11, 2003 at 4). DES has found that the withdrawal may impact wells 7000 feet away.

The Town of Nottingham relies on groundwater as the sole source of drinking water in town. The Town, and the Seacoast region generally, are growing and the number of groundwater

users in the vicinity of this proposal are expected to continue to grow. As recently stated by Mr. Stewart, director of the DES Water Division, referring to the State's groundwater resource, "We don't know enough about what we have, how it's being used, what the demand for water in the future will be, how this demand will be met and how to resolve competing demands." Concord Monitor July 18, 2004. The Town believes that the record upon which the Department's decision is based does not support the withdrawal volume granted and that the decision violates DES' responsibility to protect the public interest. The Selectmen are aggrieved with respect to the decision of the Department and assert that the Department's decision is not consistent with the requirements of RSA 481:1, RSA 485:3, RSA 485-C, and Env-Ws 388 and is unlawful and unreasonable.

Under New Hampshire law, groundwater is a public resource held in trust by the state for the public benefit. NH RSA 481:1, Coakley v. Maine Bonding & Casualty Co 136 N.H. 402, 412 (1992). A private property owner is entitled only to reasonable use. Wisnewiski v. Gemmil 123 N.H. 701 (1983).

The applicable law and policy of the State of New Hampshire is set forth in RSA 481 and RSA 485-C.

RSA 481:1 states as follows:

"The general court finds that an adequate supply of water is indispensable to the health, welfare and safety of the people of the state and is essential to the balance of the natural environment of the state. Further, the water resources of the state are subject to an ever-increasing demand for new and competing users. The general court declares and determines that the water of New Hampshire whether located above or below ground constitutes a limited and, therefore, precious and invaluable public resource which should be protected, conserved and managed in the interest of present and future generations. The state as trustee of this resource for the public benefit declares that it has the authority and responsibility to provide careful stewardship over all the waters lying within its

boundaries. The maximum public benefit shall be sought, including the assurance of health and safety, the enhancement of ecological and aesthetic values, and the overall economic, recreational and social well being of the people of the state All levels of government ... shall comply with this policy” (emphasis supplied).

In short, the Department has been directed to comply with this policy by exercising its regulatory discretion and by interpreting its regulations to protect and manage the groundwater, which is declared to be a limited public resource, for maximum public benefit.

The legislature mandated that DES implement this policy through RSA 485-C and rules promulgated thereunder. In its grant of this permit, the Department has failed to carry out its mandate to protect the public groundwater resource for three basic reasons. First, it has failed to properly interpret and enforce the law and its regulations which were established to require the applicant to prove that its withdrawal is needed, reasonable and sustainable. Second, despite recognizing the fundamental inadequacy of the applicant’s data to predict the impacts of withdrawal, instead of denying the permit, DES exclusively relies on conditions which are inadequate to protect the public interest. Third, despite a serious concern over the adequacy of groundwater resources in the Seacoast region, DES has exceeded its authority by granting the applicant a future right to withdraw groundwater, to be implemented perhaps more than 5 to 10 years in the future, without considering the future competing uses which will likely exist.

The DES grant of the permit is remarkable in light of its own statements in these proceedings. Early in this proceeding, DES carefully outlined its understanding of the requirements of the law. In its categorical denial of the same permit in August 12, 2003. It stated:

“Understanding the origin of water derived from a pumped well and its relationship to aquifer recharge, storage, and ultimately natural discharge is required by Env-Ws

388.06(1) and 388.14 and is [a] fundamental element of an analysis to determine if the proposal is sustainable and will result in an adverse impact” and

“Understanding the response of the bedrock aquifer and overburden aquifers to either precipitation events or to the pumping of large withdrawals is essential for assessing the potential for impacts to existing water resources and users as required by Env-Ws 388, as well as a fundamental component of any analysis required to determine the source of recharge to pumping for the purpose of delineating a wellhead protection area in accordance with Env-Ws 389.11(b) and 389.15.”

For unknown reasons, DES abandoned its view that these fundamental elements are required in order to support an application. Instead, DES did not require the applicant to demonstrate this understanding and decided to rely on monitoring to identify adverse impacts and to rely on enforcing reductions of withdrawals when such impacts occur. DES does not have authority to waive such fundamental elements of this regulatory program. Monitoring does not prevent adverse impacts. Reliance on conditions which attempt to provide after the fact modifications to the permit does not protect the public interest. DES, to protect the public interest, must assume that evidence of adverse impacts, their cause and extent, and efforts to modify the permit will be controversial and resisted by the applicant. In fact, even if monitoring does identify problems, DES has failed to recognize that its ability to enforce its conditions is open to question.

Equally as important is the DES decision to grant the permit in the face of uncontroverted evidence that pumping, if conducted at the present time, will draw in contaminated groundwater. In its rush to grant the permit, DES has added a condition which does not allow pumping until some point in the future when the groundwater has been cleaned up. Neither the statute nor regulations authorize, expressly or impliedly, such a condition. The entire regulatory scheme is

based on evaluation of pumping test data to determine the impact of the proposed use on existing uses. Cleanup may take 5 to 10 years or more. DES has no authority or reason issue a withdrawal permit at this time.

The Selectmen request a rehearing because the Department action is unlawful and unreasonable since the record demonstrates that the impacts of pumping on the aquifer are poorly understood and the unproven monitoring and enforcement mechanisms are inadequate to protect the public interest. The Selectmen also request an adjudicatory hearing before the Water Council under the provisions of RSA 21-O:1 and Env Ws 200 *et. seq.*.

The Selectmen have also requested an adjudicatory hearing and a filed a Notice of Appeal to the Water Council.

▪ **Summary of the status of this matter.**

USA Springs, Inc. submitted an application for a large groundwater withdrawal permit under Env-Ws 388 and a new source of bottled water under Env-Ws 389 on or about May of 2001. The application originally proposed to withdraw 125,000 gallons per day with a peak capacity of 439,200 gallons per day. After a number of exchanges of technical comments and revised preliminary applications, USA Springs submitted its final revised preliminary application on July 18, 2002. The Nottingham Selectmen submitted comments dated August 12, 2002. The Department issued its technical comments on the revised application on September 11, 2002 including many comments on the deficiencies of the withdrawal test plan. USA Springs conducted a withdrawal test from November 19 through November 29, 2002.

On February 4, 2003, USA Springs submitted the final report for large groundwater

withdrawal. On April 11, 2003, the Department issued its preliminary technical comments. The Nottingham Selectmen presented comments on the final report dated March 14, 2003 and July 15, 2003. On August 12, 2003, the Department denied the request for a large groundwater withdrawal permit under Env-Ws 388 and a new source of bottled water under Env-Ws 389. The decision set forth that, in almost every respect, the information submitted by USA Springs was incorrect and incomplete and was inaccurately interpreted such that the report could not form a reliable basis for a grant of a permit.

On September 11, 2003, USA Springs submitted a motion for rehearing with attached information which was improperly granted because it was not timely filed. USA Springs submitted a response to the August 12, 2003 decision and subsequently submitted additional information on or about September 29, 2003 and November 10, 2003. During a public comment process, the Nottingham Selectmen presented comments dated October 29, 2003 and December 3, 2003 objecting to the rehearing process. On December 11, 2003, the Department issued its final decision following the rehearing process again denying the application.

On December 29, 2003, USA Springs submitted another application for the identical project. This time, however, it did not apply for a bottled water source under Env-Ws 389. The Department accepted the application over the objection of the Nottingham Selectmen filed February 5, 2004. The Selectmen presented supplemental comments dated April 7, 2004 and May 21, 2004 with attachments thereto including technical comments of its consultant, Thomas P. Ballestero, Ph.D. The Department issued a conditional permit for the withdrawal permit only together with its Decision and Findings dated July 1, 2004. By the terms of the approval, it does

not become effective until USA Springs supplements its request for approval of a bottled water source under Env-W's 389. In short, DES has determined that it does not yet possess a completed application for a bottled water source. (Letter Kernan to Caron July 29, 2004 – Attachment A).

This motion for rehearing incorporates Nottingham's prior comments and includes the attached technical comments dated July 28, 2004 of Mr. Ballestero on the Decision and Findings Dated July 1, 2003. Nottingham asserts that the Department's decision is unlawful and/or unreasonable for the following reasons.

1. Failure to comply with the policy of RSA 481:1

The action is unlawful and unreasonable because the Department failed to apply its regulations consistent with the policy of the state set forth in RSA 481:1. DES has failed to assure that the issuance of the permit has maximized public benefit and considered the implications on groundwater resources for future generations. Although the Department has indicated that it does not have discretion to evaluate the "reasonableness" of a groundwater withdrawal application (DES Decision at 52), in fact, it is mandated by law to do so. The policy demands of RSA 481:1 together with RSA 485-C, intended that the Department exercise its expertise and discretion to maximum public benefit.

DES has been charged to protect the public trust. Nevertheless, it has conducted its review in the following manner:

- a. It accepted the applicant's testing data even though the test conditions violated DES requirements and industry practices.
- b. It accepted the applicant's hydrogeological conceptual model, even though the model was internally inconsistent.
- c. It failed to require a demonstration of the aquifer recharge characteristics and the

sustainability of the proposed withdrawal.

- d. It failed to require a demonstration that the withdrawal was reasonable and needed by the applicant.
- e. It failed to consider the impact of this permit on the public interests it is charged to protect.
- f. Finally, it impermissibly relies on an unproven monitoring program to detect adverse effects in a poorly understood aquifer system and assumed that uncertain enforcement mechanisms will be effective to prevent adverse effects after they have been identified. Monitoring does not prevent adverse effects.

Accordingly, it is unreasonable and unlawful as in violation of the provisions of RSA 481:1 for the Department to issue a permit in this matter due to the inadequacy of the data, and the risk of adverse impacts to the public interest.

2. Failure to Enforce Env-Ws 388:28(c). Criteria to Deny Permit

This regulation provides:

“The Department shall not issue a new ... major withdrawal permit if it is demonstrated that a withdrawal will result in adverse impacts which cannot or will not be mitigated (emphasis added).”

In its August 12, 2003 and December 11, 2003 decisions, DES found that the applicant's data demonstrated that its proposed withdrawal would produce adverse impacts to surrounding private property from the contamination source on the Harnum site. DES found these impacts would be immediate and irreversible. As a result, DES' own rules mandate that it “shall not” issue a new major withdrawal permit. It was unreasonable and unlawful for DES to disregard the plain meaning of its own rules in issuing the permit. DES' argument that the permit will not actually be implemented through pumping until some point in the future ignores the plain meaning of its regulations. The regulations clearly stated:

DES shall not issue a new permit which will result in adverse impacts. The application should have been denied.

3. Issuing a permit which will not be implemented until 5 to 10 years in the future is beyond the authority of the Department and does not protect public interest

As indicated in the record, the Seacoast Region of New Hampshire is undergoing dramatic growth which is putting increasing pressure on groundwater supplies. The USGS is currently studying groundwater supplies for Seacoast communities including Nottingham. See Sustainability of Groundwater Resources Project (which is incorporated by reference herein). This study will be completed by approximately January 2006. A preliminary report issued last December observed that a combination of factors "raise serious questions about the future sustainability of the groundwater resources in the Seacoast region". DES has noted that this application has greater impacts than any other it has considered (it will impact an area nearly 3 miles across). This request exceeds by itself all other withdrawals for bottled water in the state combined. Although DES asserts that conditional approvals are a standard feature of the regulatory programs, DES overlooks the unique nature of the groundwater withdrawal program. The entire regulatory program is built upon developing existing information about the hydrogeologic environment and analyzing how a proposed withdrawal will impact existing uses. In this case, the testing data developed in November 2002 is already nearly 2 years old. The demands of this area for water have changed already and may change dramatically over the next 5 to 10 years. Awaiting the results of the USGS study is in the public interest.

Given these concerns, and the state policy mandate, it is unlawful and unreasonable for

DES to grant a permit which will not be implemented for 5 to 10 years or more. A permit for future withdrawals is not allowed under the existing regulations. The Department, itself, indicated such a permit was not contemplated under the regulations.

“The Department has not indicated and does not contemplate issuing a conditional large groundwater withdrawal permit as suggested by USA Springs”. Letter Walls to Smith, November 24, 2003.

Issuing a permit at this time is unlawful and unreasonable. Until remediation is proven effective, any application is premature. The owner of the contaminated property is proceeding with cleanup. The applicant cannot exercise permit rights until it is cleaned up. When cleanup is completed, an application can be considered based upon conditions as demonstrated by a pumping test at that time. This position was established by the DES Waste Management division (See Letter McGarry to Rotondo, November 21, 2003), but was unreasonably reversed by the granting of the permit.

Although DES claims that issuing a permit now does not set aside for future use, this position does not recognize that the applicant will, of course, take the position it has a permitted right to withdraw 307,000 gallons per day which cannot be infringed on by a new use proposed in the future. It ignores the legal implications of the grant of a permit.

Although DES asserts that the grant of the permit is harmless because it is for a 10 year period only, this view is also naïve. The renewal procedures are untested. Clearly, a permit holder has a legal argument that it is entitled to maintain its withdrawal levels after its first 10 years. Further, the regulations define “adverse impact” as “a reduction in the ability of a registered water user to produce volumes based on its average daily withdrawal. In short, the

permitted capacity becomes protected by the regulatory program Env-Ws 388.18. DES should have denied the permit (as it did on August 7, 2003 and December 11, 2003) and required the contamination to have been cleaned up before considering the permit application. There is no reason, and certainly no reason consistent with the public interest, to issue the permit at this time and so it is unlawful and unreasonable to do so. There is no prejudice to the applicant because it is conceded that the permit cannot be implemented until remediation of the contamination is complete and DES apparently takes the position that the issuance of the permit carries with it no rights until it is implemented.

4. Failure to require demonstration of need

The action is unlawful and unreasonable because the Department failed to require a demonstration of need as required in RSA 485-C:4(XII). The reason for requiring a demonstration of need is to prevent demands for excessive withdrawals and consider any potential public benefits. This request is excessive by any standard. Only the New Hampshire Legislative has the authority to grant a request to withdraw more than a reasonable quantity and so the DES grant of the permit is unlawful and unreasonable.

As a practical matter, USA Springs has not yet filed a completed application for approval of a bottled water source and so it cannot establish a need for the withdrawal. Need must be interpreted to mean a "present need" or one which can be documented to occur within a short period of time. This the applicant has not done and cannot do.

The applicant has requested an extraction volume which is an order of magnitude higher than any other bottled water source. The amount requested, by itself, is larger than all other

bottled water extraction in the state combined. Nevertheless, DES did not require a demonstration of need and interpreted its regulations to allow it to simply accept the applicant's proposed theoretical bottling capacity instead of requiring a demand based upon a realistic analysis of industry standards and practices. DES did no analysis of need. It did not require an analysis by the applicant as to how the extraction level was required by its business plan. The statute does not allow DES to simply approve any amount requested by an applicant.

In this case, a demonstration of need is particularly important. DES knows that the aquifer system is poorly understood and that the extraction will partially dewater the overburden and bedrock aquifers. It also knows that data shows private wells as far away as 3000 feet away will experience significant drawdowns and wells as far as 7000 feet may be adversely effected. With this data confronting it, DES is mandated to require the applicant to demonstrate a need. Here, the applicant presented only a theoretical production capacity not a reasonable use. DES has failed to consider the public trust interest in preserving this precious, limited resource for the maximum public benefit. In considering need, DES should have applied a test for reasonableness of use, like that set forth in Restatement of Torts 850 A, which considers the following:

- a. The nature of the use: does the project result in public benefit or private profit.
- b. Whether the use removes water from the aquifer or permits some recharge.
- c. Whether testing data is sufficient to demonstrate sustainability.
- d. Whether data is sufficient to demonstrate the extent of adverse effects.

All of these factors demonstrate that this permit requests an unreasonable level of use with is not "needed" by the applicant.

5. Evaluation of Public/Private Rights: Reasonableness

New Hampshire law holds that the groundwater of the state is a public resource held in trust for the benefit of the public NH RSA 481:1, Coakly v. Maine Bonding 136 N.H. 402 (1992). Thus, private property owners are entitled only to reasonable use of groundwater adjacent to their property. Wisniewski v. Gemmil 123 N.H. 701 (1983); Report Of Public Water Rights Study Committee, December 1992. Nothing in the law authorizes DES to allow a private for-profit company to withdraw water at a rate which would interfere with another private property owners reasonable use.

The permit decision allows adverse impacts on other property owners and thus is unlawful and unreasonable law. For example, the decision anticipates impacts on wells 7000 feet away. Wells up to 3000 feet away will experience drawdowns of 40 to 60 feet; which may require lowering of pumps in private wells or deepening private wells. (See Request for Rehearing of Page and Marshall dated July 7, 2004 – Attachment C). If a homeowners well is rendered unusable by the withdrawal, the DES permit allows the applicant to lower the pump, deepen the well or provide an alternate water source. While DES understandably may have the authority to allow such a withdrawal for public use (assuming compensation is paid), the law does not grant DES the authority to allow withdrawals for private for-profit purposes which interfere with the reasonable use of the groundwater by others. In short, the DES regulations, as apparently interpreted by DES, defining adverse impacts are probably unlawful and certainly in conflict with state water policy which protects groundwater for the maximum public benefit. DES has failed to interpret its regulations such that a balancing occurs between the “need” for a

for-profit company to extract water and the impact on abutters and the general public using the same aquifer and the environment. Restatement of Torts §850A provides factors for determining reasonable use and some similar analysis should have been used. DES failure to apply such factors is unlawful and unreasonable.

6. Failure to require demonstration of sustainable use.

The Department's decision is unlawful and unreasonable in that the Department failed to require accurate, complete and correct data, demonstrating a reasonable and sustainable use and instead issued a permit which relies totally upon unproven monitoring and conditions of questionable enforceability. In its decision dated August 12, 2003 denying the permit, DES stated:

"Understanding the origin of water derived from a pumped well and its relationship to aquifer recharge, storage, and ultimately natural discharge is required by Env-Ws 388.06(l) and 388.14 and is [a] fundamental element of an analysis to determine if the proposal is sustainable and will result in an adverse impact" and

"Understanding the response of the bedrock aquifer and overburden aquifers to either precipitation events or to the pumping of large withdrawals is essential for assessing the potential for impacts to existing water resources and users as required by Env-Ws 388, as well as a fundamental component of any analysis required to determine the source of recharge to pumping for the purpose of delineating a wellhead protection area in accordance with Env-Ws 389.11(b) and 389.15."

DES never required the applicant to provide this understanding. As a result, neither the applicant nor DES knows the origin of the water derived from the pumped well and thus they do does not understand the relationship of the extracted water to important factors noted above.

This is contrary to basic hydrogeological science. See, Bredehoeft, J.D. The Water Budget Myth . Revisited: Why Hydrogeologists Model, Groundwater v. 40 n. 4 pp 340-345. As a result, DES

has no evidence to support a finding that the withdrawal is sustainable and the application should have been denied. In fact, the record shows that the withdrawal is not sustainable.

The pumping test data show that the wells never stabilized, even after 10 days of pumping. DES' own regulations with respect to small community water systems contain as a requirement in the test for sustainability that wells stabilize. Env-Ws 378.10(d)(3). This regulation is specifically referenced in Env-Ws 389.11, regulations with which USA Springs must comply. For unknown reasons, DES refused to address this obvious inconsistency in its decision and so its decision is unlawful and unreasonable.

Although DES apparently believes the wells will stabilize, it has no evidence to support this belief. DES acted unreasonably when it rejected Mr. Ballestero's demonstration using the applicant's own data, that the withdrawal is not sustainable. Mr. Ballestero used three different methods which analyzed different data sets which showed that the permitted volume is not sustainable. (See May 21, 2004 and July 28, 2004 Ballestero comments with respect to use of on storage coefficient, groundwater piezometric map and derivative presentation of pumping data). In the absence of any data showing the withdrawal was sustainable, and the presence of data showing the withdrawal is not sustainable, it was unlawful and unreasonable to grant the permit.

Remarkably, DES has conceded that it does not know, based upon the data produced by the applicant, the nature and extent of adverse effects which will occur. DES stated:

"If a given withdrawal does not reach equilibrium, it would result in continuous mining. While it appears that the withdrawal proposed by USA Springs will likely reach equilibrium, the degree that the withdrawal will affect storage, recharge or discharge at equilibrium will depend upon aquifer properties, boundary conditions, the magnitude of the proposed withdrawal, and the nature and extent of recharge. A water budget analysis does not collectively assess these elements. The withdrawal test for USA Springs demonstrated that the proposed withdrawal will partially dewater bedrock and overburden

aquifers necessitating the development of an acceptable monitoring, reporting and mitigation plan.” Decision December 11, 2003 at 9. It is inconsistent with the legislative mandate that DES manage the groundwater resource for maximum public benefit for DES grant a permit which may result in “continuous mining” of an aquifer. Such a decision is unreasonable and unlawful.

7. Failure to comply with RSA 482-A and RSA 482-A:11

The action is unlawful and unreasonable because the Department failed to comply with RSA 482-A:11 by requiring clear and convincing evidence that Barrington Prime Wetland #40 will not be adversely impacted. Although DES claims the statute does not apply to groundwater withdrawals, this interpretation is unlawful and unreasonable because DES’ own regulations Env-Ws 388:18 incorporates RSA 482-A standards. Further, DES is mandated to protect the public interest not to put it at risk.

More importantly, the data has demonstrated that the wetland will be adversely affected. The applicant’s final report documented two feet of drawdown in the overburden in the area of the prime wetland. Thus, DES finding that there will be no adverse impacts to wetlands is unlawful and unreasonable. DES simply does not know the extent of adverse impacts which will be caused. DES, itself, noted that the drawdown may dewater submerged wetlands or lower the water table below the root zone of wetland vegetation. (Decision August 12, 2003 at 4). DES’ own consultant, ENSR, concluded that,

“The leakage analysis is flawed and not based on conservative assumptions. Therefore, the conclusion of no adverse impacts on wetlands is poorly founded.” ENSR Report March 19, 2003 at 16.

DES not only failed to require “clear and convincing evidence of no adverse effects”, it failed to require any evidence that no adverse effects would occur to wetlands. Since DES has

conceded that it does not know the nature and extent of impacts in the prime wetland, the decision is unlawful and unreasonable. Again, the reliance on self monitoring to identify adverse effects in a poorly understood system and on uncertain enforcement mechanisms to stop adverse effects after they have occurred is unlawful and unreasonable.

Further, this project has had and will have adverse impacts to wetlands. The applicant violated wetlands laws by dredging and filling wetlands without a permit. An after the fact permit application is pending. The applicant then sought to dredge additional wetlands in undertaking groundwater remediation. A permit for this activity was granted based upon the representation of the applicant that the work was necessary when in fact it was not. There will be further wetland impacts when pumping is implemented. Without knowing the extent of these impacts, DES appears ready to let these adverse impacts occur and hopes to be able to mitigate the impacts later. It will be difficult for DES to insist on protection of these wetlands when the applicant argues that significant financial impacts will occur if reductions in pumping are required. Thus, the decision is unlawful and unreasonable because it does not protect the public resources to the maximum public benefit.

8. Failure to comply with RSA 483-C:9

The action is unlawful and unreasonable because the Department failed to comply with RSA 483:9, Rivers Management and Protection, by allowing what is effectively an interbasin transfer, removing 307,000 gallons per day from the Lamprey Basin without a justifying public purpose. (See, Resolution of N.H. Fish and Game Department, March 17, 2004 – Attachment D).

9. Record does not support the grant of a permit and DES failed to properly apply burden of proof to applicant

The action is unlawful and unreasonable in that it is not supported by credible evidence that the withdrawal, is sustainable, reasonable or needed. The law is clear that the applicant has the burden to demonstrate that it is entitled to a permit. DES has misapplied the burden of proof in this proceeding by apparently requiring opponents of the withdrawal to prove that it is unsustainable. Although DES is responsible to protect the groundwater resource for maximum public benefit, it has failed to require data sufficient to support the sustainability of the withdrawal. Instead, it has granted the permit and hopes its conditions will allow it to stop adverse impacts after they have occurred and before they become irreversible. This approach is particularly remarkable because DES found in its August 12, 2003 decision denying the application that the applicant's report failed categorically to comply with the Regulations. Although the applicant supplemented its report, many issues were unresolved and no technical basis existed for DES to reverse its decision. To protect the public interest, the applicant must be charged with the burden of proof that its proposal is sustainable and protective of the public interests. The applicant has failed to do so. The DES decision to not require the applicant to do so is unreasonable and unlawful because of the following:

- a. DES concedes the hydrogeological system is poorly understood. "USA Springs never fully reconciled the contradictions in the conceptual hydrogeologic model ..." (Decision and Findings July 1, 2004 at 9). DES also noted, "The Department finds that the partial dewatering of the aquifer may cause some adverse impacts initially, as some more susceptible water supplies ... are dewatered. The Department also finds that water levels in the aquifer will stabilize and that continuous dewatering will not occur." Decision and Findings, July 1, 2004 at 10.

- b. According to DES, the system does not react as a predictable porous medium, but rather as a less predictable irregular system. (Decision and Findings July 1, 2004 at 17, 18).
- c. The pumping test which produced the data upon which the applicant relies was performed under conditions which make the data of questionable reliability. (Decision and Findings August 12, 2003 at 6-9, Decision and Findings December 11, 2003 at 3,4).
- d. DES has not been able to determine the recharge rate for the aquifer and did not require the applicant to demonstrate it. It simply allowed the applicant to assume a rate of recharge of 8" per year from a literature search of New England bedrock recharge estimates, which vary widely and has not been shown to be applicable to the site. In fact, some of these studies comment on recharge not just of bedrock, but also of overburden and so are obviously not applicable. In any event, it is undisputed that bedrock recharge is unique to the site and without developing a basis for comparison, data at other sites is not useful. Further, while considering the use of data from unrelated sites, DES ignored pumping test data and other site specific data, which demonstrate that virtually no recharge occurred during the pumping test and that an assumed rate of 8 inches per year is not a reasonable estimate for this site. (See Ballestero comments May 21, 2004 at 2).
- e. DES has not been able to determine the yield of the aquifer and did not require the applicant to demonstrate it.
- f. DES has not determined the level of a sustainable withdrawal and did not require the applicant to demonstrate it.

The Department's action disregards the purpose of virtually all of the regulatory requirements established in Env-Ws 388 and Env-Ws 389 as the basis for reviewing an application. Under the interpretation of its rules which DES has applied here, DES will accept the data the applicant presents and issue a permit conditioned upon operation with no adverse effects. This is not a management of a resource to provide maximum public benefit. Such a program does not follow the law or regulations but instead defers to an untested monitoring and

mitigation plan even though there is no assurance that monitoring will promptly identify adverse impacts or that mitigation will be promptly and efficiently implemented. This laissez-faire approach is unlawful and unreasonable for a program intended to protect the public trust.

Rather than deny the permit, DES has authorized a withdrawal to occur where the nature and extent of impacts are largely unknown. DES unreasonably relies on an untested monitoring program of a poorly understood system to identify adverse effects and assumes that unproven enforcement mechanisms will enable it to stop adverse impacts after they have occurred. This is unlawful and unreasonable.

It should be noted that DES has found fault with certain positions presented by Nottingham. DES misunderstands Nottingham's position. For example, DES questions why the Nottingham ZBA granted a variance if it was concerned about water withdrawal. DES misunderstands the variance process. The grant simply allows the construction of a bottled water facility in a residential zone. The state has allegedly pre-empted groundwater withdrawal permitting and the decision of the Zoning Board did not address the withdrawal of groundwater except to say that any withdrawals would have to be approved by the state. In fact, Nottingham has specifically relied upon DES to protect its groundwater which the legislature declared to be "primarily a local resource". RSA 485-C:4.

As another example, Nottingham does not argue that the withdrawal should be limited to the water flowing under the site as DES alleges. Nottingham calculated the amount of water flowing under the site based upon accepted hydrogeologic principles because the applicant claimed it was withdrawing only "surplus" water flowing under the site. The claim has been

demonstrated to be untrue. Similarly, DES claimed Nottingham inappropriately applied a porous media analysis to issues of aquifer yield and sustainability. Nottingham demonstrated by three different methods that the applicant's data did not support a finding of sustainability. The first was an analysis of the storage coefficient. This was not based on a porous media analysis but rather on the pre-pumping test precipitation data. The second method used an analysis of a groundwater piezometric map based on pre-pumping test data. The final method was a derivative plot presentation of pumping test data. In the face of these three methods which consistently showed the pumping rate is not sustainable, it was unlawful and unreasonable for DES to grant the permit. It was unlawful and unreasonable for DES to disregard the results based on a porous media analysis where it raised legitimate and serious concerns about the sustainability of the withdrawal. Both DES and the applicant and its consultants have used this method to evaluate certain aspects of the application, including conducting the "180 days without recharge" analysis and the groundwater remediation plan analysis.

10. **Reliance on conditions requiring reductions does not adequately protect the public interest**

The action is unlawful and unreasonable because the permit and its conditions are not protective of the public trust as required by RSA 481:4. DES has conceded that the applicant has not generated an accurate hydrological model. DES has not attempted to generate a model. Nevertheless, as indicated above, DES has admitted that understanding aquifer recharge was required by the regulations:

"Understanding the origin of water derived from a pumped well and its relationship to aquifer recharge, storage, and ultimately natural discharge is required by Env-Ws 388.06(1) and 388.14 and is [a] fundamental element of an analysis to determine if the proposal is sustainable and will result in an adverse impact ..."

Remarkably, on December 12, 2003, the Department found,

“While it appears that the withdrawal proposed by USA Springs will likely reach equilibrium, the degree that the withdrawal will affect storage, recharge or discharge at equilibrium will depend on aquifer properties, boundary conditions, the magnitude of the proposed withdrawal, and the nature and extent of recharge. A water budget analysis does not collectively assess these elements. The withdrawal test for USA Springs demonstrated that the proposed withdrawal will partially dewater bedrock and overburden aquifers necessitating the development of an acceptable monitoring, reporting and mitigation plan.” (NHDES Decision, December 11, 2003 at 10, (emphasis added)).

In spite of acknowledging that bedrock and overburden aquifers will be partially dewatered to an unknown extent, DES has concluded that monitoring rather than an understanding of the hydrogeological facts relating to sustainability is sufficient to protect the public interest. In doing so, DES has disregarded its own regulations Env-Ws 378 relating to sustainability which are applicable to the applicant’s request for a bottled water source under Env-Ws 389. Monitoring does not prevent adverse effects. If the hydrogeological facts are understood, monitoring may identify adverse effects. If these facts are not understood, monitoring may not even be effective to identify adverse impacts. In any event, monitoring does not occur in real time under the best of circumstances. There is always a time span between the occurrence of the adverse effect, the collection of the data from a monitoring point, the analysis of the data, the reporting of the effect, the determination of an appropriate response and the implementation of that response. Here, monitoring fails to protect the public interest for the following reasons:

- a. DES has conceded that the hydrologic model, based upon data from a poorly designed and implemented pumping test, is not well understood. Thus, reliance on the monitoring points to identify adverse impacts in a timely fashion is unreasonable.

- b. DES has concluded that the aquifer is anisotropic, non-homogenous and exists in non-porous media. Thus, it is unreasonable for DES to conclude that monitoring points will identify adverse impacts in a timely fashion.
- c. DES has assumed that monitoring data will indicate whether groundwater is being extracted at a rate that exceeds natural recharge on average. (See Permit Condition 6(e)). DES assumes that if the data so indicates, it will be able to order a reduction in pumping rates. However, DES has not required the applicant to show what "natural recharge" is and has not made a finding on that point and so the condition is ambiguous at best and of questionable enforceability. Even assuming that the applicant, which is responsible for self monitoring, properly evaluates monitoring data, and timely reported results, there is no assurance that interpretation of the results would be agreed upon. The applicant may not agree with a determination by DES that a reduction in pumping is required. Moreover, the regulations require notice and opportunity to be heard (Env-Ws 388.25) for a modification of a permit which includes a full blown adjudicatory hearing under RSA 541-A:30(II). Thus, DES reliance on its ability to force reductions in pumping rates is unlawful and unreasonable.
- d. DES Permit Stage One Management Procedures call for reducing to 75% of permitted capacity when a drawdown of 15 feet occurs below the level of 180 day no recharge projections occurs. In other words, DES has selected what it believes is a reasonable worst case scenario (180 days with no recharge) and then allows the applicant to continue pumping at the maximum allowed rate until another 15 feet of drawdown has occurred. This is an unreasonable impact by itself. Nevertheless, as with triggers for the three other stages, there is no explanation as to how pumping rates are to be theoretically controlled by DES under these management procedures. While DES may believe the applicant has agreed to these conditions, that "agreement" is illusory. Under Env-Ws 388.25, the Department can only modify the permit after notice and opportunity to be heard including an adjudicatory hearing. Even if DES intends to attempt to unilaterally enforce these triggers, once the 15 feet drawdown level is reached and pumping is stopped, presumably pumping will be resumed as soon as the level rises above the 15 feet mark, thus, allowing the applicant to maintain the drawdown of the aquifer to 15 feet below the 180 day no recharge level. DES has no evidence on which to assess the nature of the adverse impacts this will cause. Similarly, evidence of the 15 feet drawdown is not well defined. For example, if the drawdown occurs in only one or two wells, DES must assume that the applicant will likely argue the measurement is erroneous or not associated with pumping activity and will dispute any reduction.

- e. Monitoring is performed by the applicant and persons, in its employ. In situations where monitoring results are ambiguous, DES must assume these persons will interpret the results in the applicant's favor. Where, as here, the model as presented is contradictory, data is likely to be ambiguous. This would likely delay timely response to developing adverse impacts.

For all the above reasons, the DES decision is unlawful and unreasonable as in violation of the applicable laws, regulations and State policy.

11. DES failed to consider public/private interests

In its comments on Public Trust and Reasonable Use (Decision July 1, 2004 at 52), DES states that commenters have alleged that the State cannot allow the withdrawal of water by private parties for profit. DES misstates the comments and misperceives Nottingham's position. Accordingly, it has misunderstood how its discretion should have been applied in this case. Clearly, a private property owner has a right to the reasonable use of groundwater from his property and DES should allow such reasonable uses. However, the law clearly requires DES to protect the public resource as its top priority. Nottingham's position is not that DES cannot allow a withdrawal for profit; it is that private withdrawals must be "reasonable" and balanced against the public interest in protecting a limited resource for maximum public benefit. Apparently, DES' failure to understand its mandated role has caused it to fail to evaluate this proposal on the basis of whether it is reasonable and sustainable. Further, the Department has failed to recognize that it is required to exercise its discretion to protect the public benefit.

DES' failure to recognize that it has this discretion and must apply it to this proposal is a fundamental error of law.

12. Failure to comply with RSA 485-C:21

The action is unlawful and unreasonable because the Department failed to provide written findings with respect to recommendations of the Nottingham Selectmen and their expert which are contrary to the Department's decision, and this action is contrary to the provisions of RSA 485-C:21. DES failed to make findings with respect to its obligation to protect the public interest, to determine a sustainable level of withdrawal, and to limit the applicant to a reasonable withdrawal level.

13. Failure to apply requirements of Env-Ws 388

The action is unlawful and unreasonable to the extent that the Department found that the USA Springs' submittal is consistent with law and regulations despite its finding in August 12, 2003 that the application failed categorically. For example, the test procedures agreed to by the applicant required the test to be terminated in the event of more than one inch of rainfall. DES found that 1.79 inches of precipitation fell in the three days immediately prior to the test and .55 inches fell during the test and that prior to and during the withdrawal test, aquifer and surface water levels were significantly impacted by variables such as rain, snow, temperature fluctuation including freezing temperatures and melting snow. (Decision December 11, 2003 at 3). The applicant chose to proceed with the test even though it was obvious that existing conditions made the data of questionable reliability as a result. The pumping test was inadequate to answer questions such as zone of influence, sustainability, movement of contaminants, aquifer recharge, long term dewatering of having wetlands. Despite knowledge, these critical factors were not understood, DES has not required supplementation of the first pumping test, even

though a second test could answer many of the questions. Given the background of the matter and the fact that the application is premature, DES' conduct is unlawful and unreasonable.

14. Request for Adjudicative Hearing

Nottingham has filed a request for an adjudicatory hearing to be held under the provisions of RSA 541-A:31. (See Nottingham Motion for Adjudicatory Hearing dated July 20, 2004 which is incorporated by reference herein). For the reasons set forth in that motion, it would be unreasonable and unlawful for the Department to deny Nottingham's request for an adjudicatory hearing.

Further, Nottingham has filed a Notice of Appeal with the Water Council and is entitled to an adjudicatory hearing before the Water Council under the procedures set forth in Env-Wc 200 *et. seq.* and as provided in RSA 21-O:14. A Notice of Appeal has been filed. RSA 21-O:7 establishes the Water Council which shall hear and decide all appeals from Department decisions relative to the functions and responsibilities of the Division of Water. Of course, appeals from the Water Council are conducted in accordance with the provisions of RSA 541 as set forth in RSA 485-C:21.

WHEREFORE, the Town of Nottingham Selectmen respectfully requests that the Department reconsider its findings dated July 1, 2004 and upon reconsideration, deny the USA Springs' application for a large groundwater withdrawal permit under Env-Ws 388.

Respectfully submitted,

TOWN OF NOTTINGHAM SELECTMEN

By its attorneys,

Nelson, Kinder, Mosseau & Saturley, P.C.

Dated: July 30, 2004

COPY

E. Tupper Kinder, Esquire
99 Middle Street
Manchester, NH 03101
Tel. (603) 647-1800

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing have been mailed, first class, and postage prepaid to Michael Nolin, NHDES, Harry Stewart, NHDES, Esquire, Mark Beliveau, Esquire, Armand Hyatt, Esquire, Anthony Soltani, Esquire and Assistant Attorney General Richard Head..

COPY

E. Tupper Kinder, Esquire

Attachment B (a)



State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

6 Hazen Drive, P.O. Box 95, Concord, NH 03302-0095
(603) 271-3503 FAX (603) 271-5171



Nelson, Kinder, Mosseau & Saurley, P.C.
RECEIVED

JUL 22 2004

July 19, 2004

Jon Caron
Selectman
Town of Nottingham
PO Box 114
Nottingham, New Hampshire 03290

Subject: USA Springs: Env-Ws 389 – Groundwater Sources of Bottled Water

Dear Mr. Caron:

Over the last several days, the Department has received numerous inquiries from yourself and others regarding the status of the new source approval for groundwater sources for bottled water for USA Springs wells 1, 2, and 4. The purpose of this letter is to clarify the bottled water new source approval process.

The Department issues an approval or denial for a new source of bottled water and not a permit. The regulatory process an applicant must follow to obtain approval for a new source of bottled water is to submit one document, a Final Report, in accordance with Env-Ws 389.19. The Department makes its findings in accordance with Env-Ws 389.20 based on information contained in this document. An applicant may provide preliminary information to the Department to obtain feedback during an optional pre-testing conference in accordance with Env-Ws 389.10.

The Final Report required by Env-Ws 389.19 must contain the following:

- (1) Information that demonstrates that the source meets surface water setbacks in accordance with Env-Ws 389.05;
- (2) Information that demonstrates the sanitary protective area of the well is under the control of the supplier of the water and will be maintained in a natural state in accordance with Env-Ws 389.06;
- (3) The results of a source evaluation program in accordance with Env-Ws 389.11;
- (4) A proposed permitted production volume in accordance with Env-Ws 389.12;
- (5) A source classification statement in accordance with Env-Ws 389.14;
- (6) A wellhead protection area in accordance with Env-Ws 389.15;
- (7) A contamination source and water withdrawal inventory in accordance with Env-Ws 389.16;
- (8) A contamination control program for known contamination sources within the wellhead protection area in accordance with Env-Ws 389.17; and

- (9) A copy of the well completion report prepared in accordance with We 800 to demonstrate that the construction of the wellhead complies with We 600.

In its request for approval for a new source of bottled water in 2003, USA Springs submitted the majority of the information required by Env-Ws 389.19, and only the issue of an uncontrolled contamination source caused the Department to deny the request. It is anticipated that once a Certificate of No Further Action at the Just Cause Realty site has been issued in accordance with Env-Wm 1403, that USA Springs will submit a Final Report that:

- 1) References documents on file with the Department;
- 2) Contains an updated contamination and water withdrawal inventory in accordance with Env-Ws 389.16; and
- 3) Contains a contamination control program in accordance with Env-Ws 389.17.

Although USA Springs submitted an updated contamination and water withdrawal inventory in February 2004, this inventory will have to be updated again because it must be less than 90 days old when the Final Report is submitted to the Department. If any of the information USA Springs submitted in its 2003 requests for approval of new sources of bottled water becomes outdated or superceded by new information, then this information would have to be updated and submitted by USA Springs as part of its new Final Report.

The question multiple parties have asked the Department is, "Does USA Springs currently have an active application before the Department for bottled water source approval?". The answer to this question is that Env-Ws 389 does not contain any criteria for determining what is or is not an active application. Env-Ws 389 only requires that a Final Report be submitted in accordance with Env-Ws 389.19. This report has not been submitted since the December 11, 2003 denial, although most of the information USA Springs will have to provide in the report in the future is already on file with the Department. When the Department receives a new Final Report, it will issue an approval or denial for the new source approval request in accordance with Env-Ws 389.20.

Sincerely,

COPY

Brandon Nelson, P.E.

Hydrologist

Water Supply Engineering Bureau

cc: T. Giunta, NHDES
M. Walls, NHDES
D. Farnsworth, MyKroWaters
F. Rotondo, USA Springs
Town of Barrington
Town of Northwood
M. Beliveau, Pierce Atwood
E. Kinder, Nelson, Kinder, Mosseau, & Saturely
T. Soltani, Soltani Law Office

Attachment B (b)

**Responses to 1 July 2004 NH DES Decision and Findings on the
USA Springs Large Groundwater Withdrawal Application**

**Thomas P. Ballestero
28 July 2004**

Text in *italics* is text from NH DES documents that NH DES wrote.

Page No.	Comment
1	The original 24 May 2004 request was for 439,200 gpd. The final request was for 309,600 gpd and at various times stated as 310,000 gpd. The sum of the permitted discharge of the three USA wells is 307,528 gpd.
1	<i>Dec. 11, 2003 denial was only based on water quality.</i> This seems contrary to public testimony by NH DES personnel that no such decision was made (even as of 16 April 2004). In the 12 August 2003 denial, quantity was addressed by NH DES as one of the reasons for denial, also that the permit did not meet the application requirements.. The quantity issue was never revisited in NH DES decisions. Although demonstrated impacts to homeowner wells and wetlands recharge were evident during the pumping test, these impacts were not scrutinized as to whether they could be constituted as adverse (for example flow testing affected wells), only that monitoring will address the issue. In addition, the applicant still has no understanding of recharge, the source of their pumped water, and ambient groundwater flow discharges.
2	For its second application, the applicant never repeated the pumping test when it was made clear that the original test had major flaws and some aspects did not comply with the rules. NH DES did not press for a new pumping test, especially one that could address many of the uncertainties of the proposed pumping and the fact that longer term non-pumping data existed.
4	NH DES states that the rules state that NH DES, <i>can issue a conditional permit contingent on monitoring and reporting.</i> Yet the remedial system is not in place and has not been proven to be effective. The waste management branch of NH DES is on record as stating that no pumping of the USA wells should occur until the remediation system is demonstrated to be effective. Without knowing that the proposed remedial strategy will be effective, how can NH DES issue a permit to withdraw water? Until remediation is proven to be effective, any application for a large groundwater withdrawal that exhibits a zone of influence including the Harnum site is premature. Issuing such a conditional permit does not seem to be wise or logical resource management or stewardship.
4	<i>If the applicant fails to demonstrate that their withdrawal complies with Env WS 388, the permit is denied.</i> Denial can be for: adverse impacts, conceptual hydrogeological model, contamination in the zone of influence, and the estimation of the zone of influence (this is most likely the largest ZOI in the state files!) All of these denial items exist for the requested USA Springs pumping rate, therefore the permit request should be denied. The applicant has not demonstrated that contaminants are adequately controlled. The key word here is demonstrated.
4	A New Final Report is required by the rules, but none was presented.

5	The request of 307,500 gpd is mentioned, but no explanation is given as to why this was reduced from previous requests.
5	At this time, USA Springs has only made a request for a large groundwater withdrawal (Env WS 388). No request has been made for a bottling plant (Env WS 389).
6	Irreversible impacts are considered to be adverse impacts. The loss of low flow to the Little and Lamprey Rivers is irreversible at the time of the low flows. In addition, any pumping prior to remediation of the Harnum contamination is an immediate and irreversible impact. The permit basically conditions away the adverse impacts. Therefore the decision to permit the withdrawal seems to contradict the rules themselves. If adverse impacts are predictable, issuing a permit with conditions that you monitor and wait for the adverse impacts does not meet the intent or the letter of the law.
6	<i>No issue of a new or renewed permit if adverse impacts cannot or will not be mitigated.</i> This infers that remediation must be completed before a permit can be issued.
6-7	Adverse impacts to homeowner wells are never declared. Large drawdowns are predicted for some homeowner wells. The applicant did not investigate these wells to determine their flow capabilities and whether they meet the Water Well Board minimum standards the definitions used in adverse impacts. Not investigating the homeowner wells that were markedly affected by the pumping test is a serious oversight and irresponsible action. Without investigating individual homeowner wells affected by the pumping test, the applicant is unable to make a determination of adverse impacts per Env WS 388.18.c.1. This is negligent on the part of the applicant and NH DES.
7	The adverse impact to surface water was never investigated by the applicant. Its only treatment was by NH DES which makes it appear that NH DES is doing the work for the applicant in order to result with permit approval.
7	<i>Net loss of wetlands and values.</i> This will happen. It is an adverse impact. Yet NH DES is content to issue a full permit and let monitoring identify when it happens.
8	<i>River flow.</i> The applicant did not address the impacts of the withdrawals on river flow. Reduction in river flows is identified as an adverse impact, yet NH DES did not require the applicant to address this. This indicates that the application was incomplete, and as before (12 August 2003) should have been denied.
8	<i>180 days, no recharge.</i> By using this approach and plotting the field data on semi-log plots to estimate drawdown at 180 days, the applicant and NH DES are using a porous media model to describe the data. This type of data analysis assumes that the formation is an ideal porous medium. For DES to then state that my own arguments consider the system as a porous medium yet the system does not act as a porous media is perplexing and seems to be an argument of convenience. There are methods to determine if well responses act more as porous media or as fractured media. Neither the applicant nor NH DES has bothered to investigate this or demonstrate it. This means that the conceptual hydrogeologic model is unverified and on this basis the permit should not have been issued.
8	<i>Adverse impact is identified.</i> Pumping now (issuance of the permit), will cause Harnum contaminants to move. This is an immediate and irreversible adverse

	impact. No permit should be issued for a pumping rate that results in drawdowns below the zone of known contamination until such time that the contamination is remediated.
8	<p>The mitigation conditions for an adverse impact to homeowner wells are between USA Springs and NH DES. When is the homeowner involved? Where are the homeowner rights?</p> <p>NH DES is permitting the applicant to “take” the natural groundwater level from homeowners and replace it with a lower level and the attendant: higher operating costs, increased risk of going dry, and more work for the pump. All of this taking occurs without just compensation. This is a constitutional violation.</p>
9	The applicant, <i>never fully reconciled problems with the conceptual model</i> . The applicant did not attempt to do so (the recharge mechanism and the aquifer discharge mechanisms).
9	What were the identified “substantial revisions to the conceptual hydrogeologic model”? These are not apparent and it is not evident that the applicant changed the conceptual hydrogeologic model. A second pumping test (for the second application) could have answered many questions and uncertainties. The applicant took the risk of proceeding with the first pumping test even though environmental conditions were unfavorable. This first pumping test was inadequate to answer questions such as the zone of influence in all directions, sustainability, movement of contaminants, aquifer recharge, long term dewatering of wetlands, and aquifer discharge. For some reason, based on the faulty first pumping test, the applicant is rewarded with a permit based on their inadequate performance. There should be no burden of guilt by NH DES for the financial investment by the applicant on the requirement to perform an adequate pumping test and answer many of the lingering questions. It was NH DES itself at the 16 April 2004 who stated that the applicant takes this risk.
9	The mitigation program is absolutely inconsiderate of private property rights. None of the solutions for addressing adversely affected wells address direct input from the homeowner or compensation for other than capital improvements. This simply is not fair or just.
9	<i>Monitoring prevents adverse impacts</i> . This is just not true unless the monitoring and reporting occurs in real time. NH DES cannot use arguments of hydrogeology at their convenience. If the system is so intricate that simple porous media models cannot describe its function, then monitoring at discrete locations cannot prevent adverse impacts.
10	The permit conditions are written down to withdrawals of 57,600 gpd. Is this because this is the lower limit of the State jurisdiction? What if adverse impacts are still occurring at that rate? If the permanent rate is lowered to below 57,600 gpd, does this then mean that the withdrawal must then be permitted by the town (meaning that the process is to start over anew under town jurisdiction)?
10	USA Springs pumping will affect wells 7,000 feet away. The impact of this one proposal is an area 3 miles across! This has to be one of the largest impacts in the state.

10	<i>Adverse impacts may occur due to dewatering.</i>
10	<i>The Department finds that water levels will stabilize. Based on what? Pumping wells did not stabilize during the pumping test. The applicants' estimates of water levels in all wells at 180 days with no recharge do not demonstrate stabilization. The derivative plots say that no significant recharge was achieved during the pumping test. What is the basis for this conclusion?</i>
10	Page 9 indicates that adverse impacts are prevented, and on page 10 NH DES now discusses what happens when they occur. Where is the liability for adverse impacts? Water supply alone is not an issue. Water quality, aggravation, disruption of home life, sense of security, and long term additional costs for water are all impacts that are not addressed by the proposed responses to adverse impacts.
10	Permanent alternate water supply for adversely impacted wells is offered. This simply is not fair, reasonable, or just. The homeowners were all fine before USA Springs began pumping. If USA Springs continues pumping and the state forces an alternate water supply on a private homeowner, this is an improper taking. It is unconstitutional.
16	<p>NH DES believes that the water table fluctuation method is invalid. USA Springs represented that for every one inch of precipitation, water levels in bedrock wells rose 0.5 feet. NH DES did not challenge this. The formation is confined. NH DES does not challenge this. In any introductory hydrogeology book (for example, McWhorter and Sunada, pp. 34-40), the storage parameter for confined systems is introduced. The specific storage is defined as: the volume of water released (or entering) storage per unit volume of aquifer per unit decline (increase) in pressure head. The storage coefficient includes the formation characteristics of compressibility and porosity (whether it be fractures or pore spaces), as well as the water characteristics of compressibility and density. This parameter describes how water is stored and released in all confined systems. This bedrock parameter, identified by both the applicants' consultant and myself, was used to determine how the 0.5 ft of water level rise in wells per inch of precipitation could be interpreted in terms of recharge. It was computed on a unit area basis. There is no error in the physical interpretation of what the water level rise means in terms of additional water stored in the bedrock. NH DES has accepted the applicants' data, but neither the applicant nor NH DES bothered to interpret it. The interpretation I presented previously is based on the physics of confined systems. To simply state that it is not valid is to say that the system does not obey the laws of physics. If this is true, then NH DES should not have issued a well withdrawal permit, because by not obeying the laws of physics, the conceptual hydrogeologic model is seriously in error.</p> <p>What is remarkable is that in its denial of the first permit application on 12 August 2003, NH DES wrote in its summary of findings to support the denial that,</p> <p><i>"Understanding the origin of water derived from a pumped well and its relationship to aquifer recharge, storage, and ultimately natural discharge is required by Env-WS 388.06(l) and 388.14 and is [a] fundamental element of an analysis to determine if the proposal is sustainable and will result in an adverse impact..."</i></p>

	<p>The applicant has not complied with this facet of the statute. My calculations and presentations under this comment and others were directed at exactly this aspect of the rules. It is unclear why, and when, NH DES stopped requiring attention to this.</p> <p>It is imperative to underscore that various sets of data supplied by the applicant (pumping test drawdown, piezometric map, ambient water level changes to precipitation) and different methods of interpreting the data result in consistent conclusions: the requested pumping rate is unsustainable. Instead of taking this singular conclusion seriously, NH DES discards it by basically stating that the methods of analysis (all of them) are inappropriate. Yet at the same time, the applicants claims of "excess water" are never challenged by NH DES or supported by the applicant by technical data.</p>
16	<p><i>Nottingham...assumed that the storage coefficient was equivalent to the specific yield.</i> This is not true and it was never stated in Nottingham testimony. NH DES does not understand the bedrock recharge argument presented to it and does not understand the physical significance of storage in confined systems. Again, reference is made to any introductory hydrogeology text for information about storage in confined systems (for example, Freeze and Cherry, pg. 60).</p>
17	<p><i>Nottingham recommends that the withdrawal volume...be determined based on the amount of water that flows beneath the site.</i> This is not true, but it is inferred by NH DES. The reasons for identifying the quantity of water that flows below the USA Springs site are to: a.) refine the applicants very frequent claims that there was substantial water flowing under the site and that they were only pumping "surplus" water (a claim never proven by the applicant or refuted by NH DES), and b.) to assist the delineation of the conceptual hydrogeological model (which the applicant did not do, and in which NH DES displayed no interest). The applicants' conceptual hydrogeologic model possessed serious contradictions about recharge from the overburden. Instead of reconciling these differences, the applicant simply decided to propose monitoring and NH DES accepted this. Data was available to make estimates of system groundwater flow and revise the conceptual hydrogeologic model. Why the applicant was not pressed to do so, and why NH DES did not see the importance of employing the data collected by the applicant is unknown. The applicant uses a presumed infiltration over a large area that is not entirely hydraulically connected to its pumping wells. The applicant then goes on to compare this fictitious recharge rate to its requested pumping rate and shows the proposed rate is insignificant. I have shown, using the applicants' own data, a more realistic flow scenario for the ambient system, and a flow scenario that is supported by the applicants' consultant at the location of contamination. The objective was to quantify the flow in the conceptual hydrogeologic model in order to identify what is a sustainable flow. This method is consistent with determining the sustainability of ground water pumping from wells. Support for this method may be found in USGS Circular 1186 or the article written by Bredehoeft (Groundwater vol. 40, no. 4). What is disconcerting is that the applicant uses calculations that have almost no connection to physical reality, and these calculations are used to support their claims about water availability at this site. The pumping test data (both the step tests and</p>

	<p>the pumping test) all clearly demonstrated that this bedrock system can not sustain the original pumping rate requested by the applicant, or the permitted rate. In addition, the applicants' data from the pumping test reveals that the bedrock system, under the pumping test pumping rates, did not secure any perceptible recharge: meaning that the pumping test water came primarily from formation dewatering. To underscore the importance of this point: the pumping test occurred during a very wet period and not a dry period, and yet the pumping test data do not exhibit signals that the wells were doing much more than dewatering the formation. If the pumping test were to be performed in a dry period, such pumping adverse effects would be magnified.</p>
17	<p>Reference is made to a July 2003 USA Springs report. Does the reference in reality mean the July 18, 2002 Gradient Report? The referenced Table 1 of this report discusses fracture zones, but does not claim that flow is not laminar. The NH DES comments go on to state that because there are so few fractures in the USA Springs pumping wells, there cannot be laminar flow, and therefore Darcy's law is violated. The NH DES response is a synthesis of unverified assertions and not germane to the argument. The response is unverified because neither the applicant nor NH DES computed Reynold's number or witnessed non-laminar flow. They are not germane because the comments that I made about ambient flow under the site are for non-pumping conditions when, in fact, the system is flowing as laminar flow. Hydraulic studies at the UNH Bedrock Bioremediation Center (BBC) site have shown that even during pumping conditions in bedrock wells with flow in few fractures, flow can still be laminar. This is one of a few examples of when the NH DES decision uses an argument of convenience to refute public comments, and yet employs the same argument to accept the applicants' information. When the applicant plots time versus drawdown information (from the pumping test) on semi-logarithmic scales and then and draws straight lines on the plots to predict drawdown at 180 days without recharge, this is assuming that the formation is subscribing to Darcy's law, flow is laminar, and meets many of the assumptions of well pumping theory. The data certainly did not match the straight lines, and so by drawing the straight lines on these plots, and NH DES accepting them, both the applicant and NH DES have accepted that the system can be described by traditional well pumping theories.</p> <p>NH DES is unwilling to accept any technical arguments that do not support this application if such arguments consider the bedrock groundwater flow as a porous media system. Yet, NH DES accepts the applicants' interpretation of its data when the applicant uses the porous media concept. An example of where data is analyzed with a porous media concept by the applicant, and the analysis is accepted by NH DES is when the applicant plots drawdown versus distance on a semi-log plot. I accepted this posture (the system acts as a porous media) and used these same assumptions for my arguments. If NH DES believes that the system is operating under other hydraulic principles, it is incumbent that they or the applicant clearly state them, and then use them to interpret their data.</p>
17	<p>NH DES maintains that the fracture distribution at the site is not dense enough to warrant a porous media approach. Since fracture density in the USA Springs wells was not reported as part of its application, it is not obvious how NH DES can make</p>

	<p>this assertion. If one inspects the hand written field notes of outcrop strike and dip measurements (Volume II, Appendix C of the 18 July 2002 Gradient report), one will see that in the outcrops, fracture spacing was on the order of inches to feet: in all cases less than 10 feet. Research at the UNH BBC site (see http://www.unh.edu/erg/bbc/AGU_2003.htm) has demonstrated that for pumping or slug tests, fractured rock formations act as a porous media at distances of 1 to 30 times the median fracture spacing. Given the reported fracture spacing in outcrops and the variety of their orientations, it is more than likely that even under pumping conditions the bedrock performs as a porous media after a few hundred feet from the pumping wells. Recall that the pumping effects were measured thousands of feet from the pumping wells. Along the lines of this comment, NH DES believes that my comments about the groundwater hydraulics are inappropriate at the small-scale. The department does not define what small-scale is, however by plotting the interwell transmissivities from all of the pumping tests completed at the Harnum site, one can see that at this scale, there is a high degree consistency in all directions. If NH DES claims that a porous media approach cannot be used to support my arguments about groundwater hydraulics and sustainability, then the approach should be inadmissible for not only the applicants' large groundwater withdrawal request, but also the remediation of the contamination at the Harnum site: the porous media approach has been used and seems to be accepted by NH DES for these two situations, therefore it should not be concluded by NH DES that the approach is untenable for my arguments.</p>
18	<p><i>The Zone of Influence...is...indicative of a failure in the porous media assumption.</i> This is not necessarily true. In previous comments, NH DES was told that other porous media models, such as a well pumping in a uniformly sloping flow field, can also explain the shape of the zone of influence. This was not addressed by either the applicant or NH DES.</p> <p>It should be noted that the effects of pumping (drawdowns) that were developed into contour maps, were based on the precipitation-corrected water level data. The USA Springs corrections are very suspect. Some of the homeowner wells that USA Springs were reported to exhibit no recorded drawdown during the pumping test, actually exhibited rising water levels (for example Batchelder, 78 Freeman Hall Road) during the pumping test (in some cases more than five feet!). This means that the USA Springs precipitation correction was inaccurate and that they may have reported no drawdown when in fact drawdown occurred. As pointed out by myself in testimony to both the applicant and NH DES, correction for ambient signals (barometric pressure changes, precipitation, melting snow, etc.) is most important for the wells far away from pumping in order to more accurately determine the zone of influence.</p> <p>In its analysis of the water level data before and after the pumping test, the applicant first ignored the effect of precipitation on water levels. Then when it was pointed out to the applicant that this was not an accurate representation of the system, the applicant developed a casual correction to water levels to account for the effects of precipitation. The applicants' correction is insufficient to assist in the determination</p>

	of the zone of influence of the pumping test. This fact is evidenced by the number of "corrected" well water levels that continue to show water level rise during the pumping test.
18	<i>Potentiometric map...is very irregular.</i> NH DES implies that the bedrock potentiometric map supplied by the applicant demonstrates that the bedrock does not act as a porous media. The bedrock piezometric map is no more irregular than the overburden maps, which are themselves porous media. This is another example of a NH DES argument of convenience: they accept the applicants' data without question but do not accept, or attempt to test with the applicants' data, the interpretations that I have furnished.
19	The MykroWaters calculation of the ambient flow under the Harnum site, for a 100 foot length of bedrock perpendicular to groundwater flow, was the same type of calculation that I performed under the USA Springs site. By NH DES accepting the calculation in one instance and rejecting it in another is another example of a NH DES argument of convenience.
20	NH DES states that, <i>no rainfall at all for 180 days</i> . This is stated more accurately that there is no aquifer recharge for 180 days.
20-21	NH DES paints a dramatic picture of how bedrock groundwater age can be determined. At a minimum, during the pumping test, samples could have been taken from the pumped wells and analyzed for Tritium or CFCs. These are inexpensive analyses, and they are a good litmus test to determine if the water is younger or older than 50 years. The method proposed by NH DES (many wells at various horizontal and vertical locations) certainly is more accurate, but is not necessary to get some handle on groundwater age. The applicant claims that there is continual local precipitation recharging the bedrock. If this is true, then samples analyzed for Tritium and/or CFCs would bear this out. This is not an onerous task nor is it uncommon. I suggested this prior to the pumping test and neither the applicant nor NH DES chose to act on it. Instead, the unsubstantiated claims of recharge, presented by the applicant and accepted by NH DES, persist.
20-21	NH DES quotes a USGS publication (WRIR 98-4232, pg. 47) and then goes on to state, <i>This document states... bedrock recharge may be significant and higher than historically estimated.</i> This is inaccurate and misleading. The quote that NH DES shows refers to groundwater recharge to all layers of the earth in those studies: overburden and bedrock. The issue of the USA Springs application is bedrock, and therefore all comments and citations must be for bedrock alone, and not bedrock lumped in with the more permeable overlying formations.
21-23	NH DES cites various studies referring to groundwater recharge. In some of these citations, the recharge that they cite is not just bedrock but also that of overburden. But in general, the hydrology of individual cites cannot be generally assumed to be true everywhere. These may be yardsticks for comparison; however neither the applicant nor NH DES developed any of their own recharge estimates that could be substantiated by data. The applicants own data argues against the recharge rate that they claim.
25	NH DES attributes the following quote to me from my 21 May 2004 comments: "no bedrock observation wells to the northeast or west". No such quote appears in that document. The point of my comment was that USA Springs did not have wells in

	the necessary locations to answer questions and uncertainties about the conceptual hydrogeologic model and the zone of influence. My comments were misquoted and misrepresented by NH DES.
26	It should be noted that the NH DES posture is that the most reliable field data for this application is that of the <i>large scale</i> pump test completed by USA Springs.
26	NH DES cites the well yield versus well depth data for homeowner wells that was reported by USA Springs in its application. This database was developed primarily by drillers and not based on pumping tests but course estimates of well yield. This data is notoriously inaccurate and therefore is no basis for conclusions about groundwater hydraulics at the site.
27-28	I spent significant effort analyzing the pumping test data using the method of derivative plots. This method was presented earlier to NH DES at the 16 April 2004 meeting. The primary conclusion of the derivative plot analysis is that there was no significant recharge to the pumping or monitoring wells during the USA Springs pumping test: pumped water was derived from dewatering the formation. Therefore it is not clear how the applicant or NH DES can state that there is adequate recharge at the site to sustain the permitted pumping rate.
29	<p>In another instance of misquoting and misrepresenting my comments, NH DES uses the phrase "<i>thousands of feet away</i>" to imply that I was only talking about wells at that distance and that the figures in my report (as displayed in a table in the NH DES comment) were for distances closer than 1,000 feet. The full quote of my comment is,</p> <p>"...the pumping test itself also clearly demonstrates that even the 10 days of the USA pumping test were excessive withdrawals. Figures 2 through 11 display the plots of drawdown versus time for wells during the November 2002 pumping test of the USA Springs wells. What is quite remarkable is that for all of the bedrock wells (Figures 2 through 9), including the five days with no pumping (the recovery period), there was still a significant amount of residual bedrock drawdown: in the USA wells as well as abutter wells thousands of feet away! This demonstrates that significant dewatering occurred during the pumping test. In addition, this is proof that there is much less ambient flow below the site than is claimed by the applicant. If the recharge rate existed that is claimed by the applicant (Table 3-9 of the 3 February 2003 Gradient Report), then the system would have fully recovered well within the 5 days of recovery. This obviously did not happen. Just as troublesome is that well P-3D (a deep overburden well) also did not recover after the 5 day recovery period. "</p> <p>Obviously I was talking about all wells in the system. The wells that I selected to demonstrate this point were wells at various distances from the pumping wells, including the pumping wells themselves.</p> <p>NH DES identifies in their comment that USA Springs did not comply with the statutes because they did not monitor long enough for recovery.</p> <p>Also in its response, NH DES states that I used only selected wells for my</p>

	<p>comments, and not all wells. I think that it was incumbent upon the applicant and NH DES to sift through and discuss ALL of the data. They did not. They selectively took the data that supported their positions and ignored other relevant and important data.</p> <p>The data presented by NH DES for well P-3D (their Figure-1) is uncorrected for precipitation. The well drawdown and pumping effects are superimposed on the rising water level in that well before the test. To compare the water level at the end of the recovery period to that before the test, in the face of such dramatically varying water levels, proves nothing without the appropriate corrections applied to the data. The NH DES argument that observation wells, <i>exhibited rapid recovery once pumping...terminate</i> is not being argued. The point of my comments was that the pumping caused severe drawdown over a large distance and that when pumping ceased, recovery to 95% was slow and not complete (recall that the pumping test was during a very wet period of active recharge). This is more evidence that the permitted pumping rate is unsustainable and may be causing irreversible impacts.</p>
32	<p>NH DES callously states that large groundwater withdrawal permits have been issued for other bedrock wells. This argument is hollow: no two sites are the same, and no information was presented to compare the other sites to the USA Springs site.</p> <p>What resounds about the USA Springs application compared to other large groundwater withdrawal applications reviewed by NH DES, is what NH DES wrote in its decisions and findings in its 11 December 2003 denial of permits for the USA Springs wells:</p> <p><i>"The results of the withdrawal test conducted by USA Springs demonstrated that more total impacts, and more impacts over a greater distance, occurred than for any other similar large groundwater withdrawal permit application reviewed by the Department."</i></p>
32-34	<p>NH DES goes to great lengths to discredit and discount the derivative plot analysis. The NH DES comments focus on two basic points: the data and the method used. In the case of the data, NH DES believes that the USA Springs pumping test is too noisy to use the derivative plot method. This is the same time-drawdown data that NH DES accepted from the applicant and that NH DES, on page 26 of their 1 July 2004 decisions and findings, termed as "the more reliable and comprehensive" data. The derivative plot analysis is an interpretation of this data just as plotting it or using it to project out to 180 days. If the data is inadmissible for the derivative analysis because it is too noisy, it is inadmissible for other interpretations as well. This is another example of NH DES using an argument of convenience to support their findings.</p> <p>The second point was the method used for my derivative plots as well as my mathematical solution. How NH DES can make these comments is dumbfounding since: on 16 April 2004 I e-mailed references for the method to NH DES, on 21 April 2004 I electronically sent my spreadsheet files with the derivative analyses (of the applicants' data) to NH DES, and on 26 April 2004 I personally handed my own</p>

	<p>reference book on the method to NH DES. All my e-mails were received and replied to by NH DES. So how NH DES could not find my solution is a mystery, since the equations were in my spreadsheet, and the equations are based on the published literature. Also, NH DES never took or requested an opportunity to ask me to explain my analyses.</p> <p>To account for noisy data, very often time series data are “smoothed”. I performed my analyses with and without smoothing (up to 20 points). After I made my spreadsheet submittals to NH DES, I also checked the analyses with commercially available software (AQTESOLV) and obtained similar conclusions for the derivative plot analyses: the pumping test data does not show that a significant source of well recharge occurred during the pumping test, and therefore the permitted discharge does not appear to be sustainable.</p>
34	The last paragraph before section 5.4 is either missing text or has a misspelling, because it is very difficult to interpret as written.
41	NH DES comments on Figure 24 from my 21 May 2004 written comments, that I must have used some other data source. NH DES then offers a copy of the data for wells P-1S and P-1D from the USA Springs reports and data CD. The USA Springs and NH DES plots for these two wells only show a water level history in each well which cannot be compared to each other (the two wells form a vertical couplet). My plots used the applicants’ data and well completion reports to calculate the water levels with respect to a common vertical datum. In this way the water levels in the vertical couplet can be compared, and the time history of how the bedrock pumping affects overburden (and therefore possibly wetland) water levels interpreted. The source of my data was the USA Springs data CD and the well completion specifications reported by USA Springs: both USA Springs and NH DES could have developed these plots to demonstrate the effects of pumping on wetlands. They did not. What is surprising is that instead of trying to recreate my plots or discussing what they mean, NH DES simply dismisses them. This is yet another example where NH DES is discarding or discrediting my arguments, based on the applicants’ data, when the conclusions do not match those of NH DES and the applicant.
49-50	NH DES compares all of the impacts on surface water to Mendums Pond. It is not obvious why, since my comments are directed at the Little River and the Lamprey River. I used decades of gage data to make my case, and therefore I could discuss the low flow occurrences. NH DES used long term averages (annual and monthly) to make their case that surface water flows will not be affected by USA Springs pumping. However the more appropriate comparison is to the low flows.

General Comments

1. There is a conundrum with the conditional permit in that if another nearby large groundwater withdrawal is permitted prior to USA Springs beginning their pumping (it could be 5 to 10 years before USA Springs can start pumping), and there is well interference, who has the senior right when the issue is disputed? Meaning which entity will be required to reduce there flows from the permitted amount?

2. Very often the applicant has used the concept that there is "surplus" groundwater at this site and that they are merely pumping a small fraction of what is flowing by. NH DES has never challenged this. Yet I demonstrate with various calculations that no such surplus or excessive water flow exists. One of the methods to perform my calculation is supported by calculations by the applicants' own consultant. Why has NH DES not challenged this and demanded that the applicant demonstrate that their proposed pumping is sustainable? Why has NH DES not required the applicant to back-up their claims about water surplus and excess?
3. There was no mention of the ongoing (for two years now) USGS bedrock aquifer study. This is a study of the groundwater flow under all seacoast towns westward from Northwood to the ocean. All communities paid public funds towards the performance of this study because they believe that groundwater supplies are dwindling. Frequently, many towns have water bans or restrictions every year. The towns have demonstrated a concern for the sustainability for bedrock groundwater supplies and are interested in stewardship of the resource, yet the state, by not seizing on the significance of the USGS study, demonstrates that it does not share this concern for stewardship.
4. If NH DES had questions about any of my comments or methods, why didn't they call me?
5. There was no mention of the 16 April 2004 meeting.
6. If NH DES or the applicant do not possess a theoretical model and understanding of the system hydraulics (porous media or fractured media), then it is incumbent that sufficient empirical data is generated to understand the system. This means gathering data to confidently predict system performance during extreme times and conditions. The data gathered to date does not support the contention that pumping 307,528 gpd is sustainable.

Attachment B (c)

State of New Hampshire
Department of Environmental Services
Water Supply Engineering Bureau
PO Box 95, 6 Hazen Drive
Concord, NH 03302-0095

7/7/04

Attn: Mr. Michael P. Nolin, Commissioner

Re: Large Groundwater Permit
No. LGWP-2004-0003

Dear Commissioner Nolin,

It is my understanding that your DES office issued the above identified permit to USA Springs, Inc. of 9 Pelham Drive, Pelham, NH on July 1, 2004.

This person, James H Page Jr., owns property at 187 Old Turnpike Road, Nottingham, NH. This property shares a well with Thomas and Robin Marshall, who own property at 189 Old Turnpike Road, Nottingham, NH. This well is on the common property line between the two parcels. It has been in operation for some 42 years. This is not a single residential well servicing an individual residence. It services two distinct, separately owned parcels as a community or public well.

In July of 2001, I spoke at a public forum and brought this to the attention of your DES representatives and USA Springs, Inc. representatives present at the hearing, including the owner of record, Mr. Rotondo. After speaking, I discussed this directly with Mr. Brandon Kernen, Hydrologist, of your DES office.

This was again brought to the attention of your office in a letter to Judy Maloney of your DES office along with other general concerns.

In 2002, before USA Springs, Inc. commenced test pumping, I forwarded a letter to Mr. Brandon Kernen of your DES office. It again stated my concerns and comments regarding this community well. I also spoke to Mr. Kernen via phone. This well was subsequently identified as a test site by DES.

I spoke with Aires Engineering in November, 2002 via phone at their office and in the field and specifically requested that this well be identified as a community water source servicing two distinct properties. This person and Thomas Marshall granted permission to allow monitoring of this location.

I take exception to page 3 of 8 of your permit listing this well location under the heading of private wells with no annotation showing this location as a community/public source.

I take exception to Table 1: Trigger Water Level Elevations for USA Springs Large Groundwater Withdrawal Permit 2004-2003. This table identifies this well on Map 2, Lot 5 as being allowed a 180 day No-Recharge Drawdown to El 357. Stage 1 Trigger Level is El 342.

Test information on this well indicates static head at El 405+/- . Simple daily drawdowns from individual pumping requirements draw this head down an average of 30 ft. Assuming the demands of two properties concurrently (ex. (2) showers), simple math would drop the head 60 feet or 90 gals equivalent. From your Table 1, at a head of

El 357, the drop would put the static head at El 297. If trigger was reached at Stage 1, the static head could be at El 282. Pump level in this well is El 267+/- . This leaves only a 15 ft. head or about 23 gals of water. This well will be non functional. It can very easily be deduced that this well will recover very slowly as it is a low yield well in and of itself.

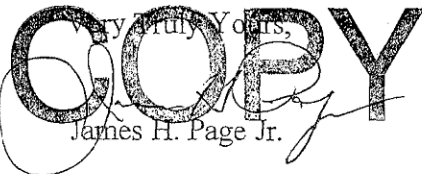
USA Springs, Inc. pumping will slow recovery and flatten the gradient much more.

By DES Env-Ws 388.18 Adverse Impact Criteria (c) (2) b. " ... the adverse impact shall be any reduction in the ability to produce water." By discussion with your own DES officials that I spoke with in the past, this wells ability to produce water cannot be impaired or altered in any manner by the operations and actions of USA Springs, Inc. pumping operations.


I feel that I have given more than ample notice to all parties involved in this permitting process of the conditions at this well location. It is apparent that this has not been adequately dealt with by the DES or by USA Springs, Inc. Consequently, I object to your findings in your permit and ask for this matter to be dealt with accordingly under the current DES WS rules. This letter shall serve as a notice of appeal as given in 6.0 p78 of 78 of your decision regarding this well location at 187/189 Old Turnpike Rd.

Please advise this person, property owner James Page, property owner Thomas Marshall, and the Nottingham Board of Selectmen within 10 days of receipt of this letter as to how the DES intends to handle this matter.

I may be reached by mail at: James H. Page Jr.
PO Box 1254
Dover, NH 03821-1254
or email jpage@comcast.net

Very Truly Yours,

James H. Page Jr.

Thomas Marshall


Thomas Marshall

cc Town of Nottingham Board of Selectmen
Mr. Anthony Giunta, DES

Attachment B (d)

The State of New Hampshire
Fish and Game Department
-Resolution-

Ground Water Withdrawals

WHEREAS, the legislature recognizes that groundwater constitutes an integral part of the hydrologic cycle and the protection of groundwater quality is necessary to preserve the integrity of surface water; and

WHEREAS, groundwater supports surface water levels in wetlands, streams, river, lakes, and ponds that support habitat for numerous and significant species of fish and wildlife; and

WHEREAS, the New Hampshire Fish and Game Department is legally responsible for the protection of the state's fish and wildlife;

THEREFORE BE IT RESOLVED; that the New Hampshire Fish and Game Department opposes any large groundwater withdrawal that may adversely affects surface waters that support fish and wildlife.

Unanimously adopted by the New Hampshire Fish and Game Commission this seventeenth day of March, Two Thousand and Four.

COPY

Ellis R. Hatch
Ellis R. Hatch, Chairman
NH Fish and Game Commission

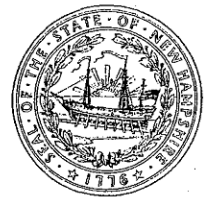
COPY

Th. J. Lee
Th. J. Lee
Executive Director

Attachment C



The State of New Hampshire
Department of Environmental Services



Michael P. Nolin
Commissioner

Nelson, Kinder, Mosseau & Satureley, P.C.
RECEIVED

JUL 8 2004

July 1, 2004


Francesco Rotondo
USA Springs Inc.
9 Regis Drive
Pelham, New Hampshire 03078

Re: USA Springs Large Groundwater Withdrawal Permit – No. LGWP 2004-0003

Dear Mr. Rotondo:

Enclosed is a large groundwater withdrawal permit and associated decision statement in response to your large groundwater withdrawal permit application dated December 29, 2003.

Please note that Condition 10 of the large groundwater withdrawal permit requires that USA Springs obtain new source approval for bottled water from the Department for each well in accordance with New Hampshire Administrative Rule Env-Ws 389. USA Springs will need to supplement its 2003 request for approval of new sources of bottled water with information required by Env-Ws 389.16 and 389.17 to demonstrate that uncontrolled contamination sources do not exist within the wellhead protection area of its withdrawals.

Sincerely,

Michael P. Nolin
Commissioner

cc: Town of Nottingham
Town of Barrington
Town of Northwood
M. Beliveau, Pierce Atwood
E. Kinder, Nelson, Kinder, Mosseau, & Satureley
R. Head, DOJ
A. Giunta, DES
H. Stewart, DES
B. Kemen, DES



The
NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES

hereby issues

LARGE GROUNDWATER WITHDRAWAL PERMIT

NO. LGWP-2004-0003

to the permittee

USA SPRINGS, INC
9 REGIS DRIVE
PELHAM, NEW HAMPSHIRE 03078
(603 942 5660)

for the withdrawal of the following volumes of groundwater from the following on-site wells for the purpose of bottling water

Bedrock Well USA-1	106,486 gallons over any 24-hour period
Bedrock Well USA-2	179,874 gallons over any 24-hour period
Bedrock Well USA-4	21,168 gallons over any 24-hour period

located at 145 Old Turnpike Road in Nottingham, New Hampshire (Lot 10, Tax Map 3)

Date of Issuance: July 1, 2004
Date of Expiration: July 1, 2014

Pursuant to authority in N.H. RSA 485-C:21, the New Hampshire Department of Environmental Services (Department), hereby grants this permit to withdraw groundwater from USA -1, USA-2, and USA-4 subject to the following conditions:

1. The permittee shall comply with the requirements of Env-Ws 388 at all times.
2. Pursuant to RSA 485-C:15, the permittee shall allow any authorized member of the Department's staff, or its agent, to enter the property covered by this permit for the purpose of collecting information, examining records, collecting water level measurements, or undertaking other action associated with this permit.
3. Water Conservation: In addition to the measures the permittee proposes in its Permit Application dated February 3, 2003, which is incorporated herein by reference, the following measures shall be implemented:
 - a. The permittee shall complete annual pressure testing and leak detection surveys of piping connecting the wells to the bottling plant. All leaks must be repaired within 60 days of discovery. Alternatively, the permittee may utilize meters and totalizers at the wellhead and the bottling plant to determine if water losses exceed 5%. If water losses exceed 5% between the wellhead and the bottling plant, a leak detection and repair program must be implemented. Meters and totalizers must meet the requirements in item 4, below. The permittee must report a summary of activities it undertook to identify and repair pipeline leakage in an annual report by January 31 of each year.
 - b. The permittee shall maintain shut-off devices in its bottling process that prevents the discharge of unused water to waste.
4. Metering Requirements: Withdrawals from all wells must be metered at all times. The permittee shall provide the Department with a certificate of calibration for each meter, as well as the performance specifications of the meter as prepared by the manufacturer. All meters must be sized and calibrated to monitor the applicable withdrawal and flow rates. The permittee shall also provide the Department with the maintenance and calibration requirements of the meter as prescribed by the manufacturer. The permittee shall maintain and calibrate the meters in accordance with the specifications of the manufacturer. The permittee shall document and maintain records of all meter maintenance and calibration activities and submit this information to the Department in an annual report by January 31 of each year.

5. Monitoring and Requirements

The permittee shall establish and maintain the monitoring and reporting program as described below. The monitoring and reporting program shall be established within the next 60 days and be implemented for at least three months prior to initiating large groundwater withdrawals at the USA Springs site.

- a) Water Level Monitoring: The permittee shall complete the following water level monitoring and reporting program:

- i) Off-site Private Wells: Install pressure transducers and data loggers and measure water levels at a frequency of at least every four hours in the following private wells:

Nottingham Private Wells

Lot	Address
3-6	165 Old Turnpike Road
3-2	162 Old Turnpike Road
3-2-1	158 Old Turnpike Road
3-3	166 Old Turnpike Road
3-2A	164 Old Turnpike Road
2-7	181 Old Turnpike Road
2-5	187 Old Turnpike Road
2-8A-4	186 Old Turnpike Road
3-11-15	3 Lincoln Drive
3-11-9	19 Lincoln Drive
3-12-1	86 Freeman Hall Road
14-16	45 Garland Road
14-18	39 Garland Road

Barrington Private Wells

Lot	Address
7-2B-1	4 Wood Road
7-3-8	32 Wood Road

- ii) On-site Production Wells: Install pressure transducers and data loggers and measure water levels at a frequency of at least every four hours at USA-1, USA-2 and USA-4.
- iii) On-site Monitoring Wells: Install pressure transducers and measure the water levels at a frequency of at least every four hours at the existing and proposed monitoring well locations described in Section 1.2 of Attachment 2 of a letter dated September 11, 2003 incorporated herein by reference from the Gradient Corporation to the Department. The permittee shall install a staff gage, shallow monitoring well, and deep over burden monitoring well at each of the following wetland monitoring sites after obtaining approval from the Department: WM-4, CON1, and CON2. The permittee shall provide the Department with soil boring data and monitoring construction details prior to seeking approval from the Department.

If a private well owner denies permission to monitor water levels, then the permittee shall propose an alternative monitoring location to the Department for

approval. The permittee shall monitor the alternative location upon receiving approval from the Department.

All water level monitoring shall be completed by a person who can demonstrate, by education or experience, competency in collecting and reporting hydrogeologic measurements.

All monitoring data shall be submitted to the Department by the last business day of each calendar month in an electronic format. Water levels shall be reported to the Department as feet relative to the National Geodetic Vertical Datum of 1929. The permittee shall note any relevant observations that may affect water level measurements.

A summary of all monitoring data shall be prepared in a hard copy format and submitted to the Department by January 31 of each year. The annual report shall include all field notes documenting the water level monitoring activities for the preceding year. All field notes shall be signed and dated by the personnel responsible for collecting measurements.

Monitoring well locations and frequencies may be added or changed if the water level data obtained in paragraphs (i)-(iii) above contradict the information obtained in the permittee's application, or if additional data points are required to assess the potential for adverse impacts to occur.

- b) Wetlands - Implement the wetland monitoring program summarized in Attachment 2, Section 1.2 of a letter dated September 11, 2003 from the Gradient Corporation to the Department. The wetlands monitoring program shall initiate one year prior to initiating withdrawals and continue indefinitely as a condition of the permit. All work shall be conducted under the direct oversight of a New Hampshire Certified Wetland Scientist. The tri-annual wetland survey must provide a clear determination as to whether or not an adverse impact has occurred, may occur, or has not occurred over the monitoring period. An annual wetland monitoring report must be submitted by January 31 of each year. The results of the tri-annual wetland monitoring and associated impact assessment must be included in the annual wetland monitoring report unless requested sooner by the Department.
- c) Stream Gaging: The permittee shall install a weir in the unnamed stream that flows from its site into Round Pond. The weir shall be installed in a stream channel as close as is technically, logistically, and legally possible to Round Pond. The stream flow at the weir shall be monitored weekly starting one year prior to initiating withdrawals, unless snow and ice make measurements not possible. The permittee may propose an alternative method to accurately measure stream flow to the Department. This permit condition shall not be enforced if the permittee can demonstrate that property owners will not grant access to the stream for monitoring.

6. Mitigation Requirements

- a) In the event that adverse impacts occur, the permittee shall comply with all of the requirements below and with the impact mitigation and source replacement requirements of Env-Ws 388.
- b) Prior to initiating the large groundwater withdrawal, the permittee shall notify any owner of a private well within 7000 feet of USA-1, USA-2, and USA-4. The permittee shall provide copies of the certified returned receipt to the Department. The permittee shall explain to owners of wells in the area that their well may be influenced by the withdrawal at USA Springs. The permittee shall provide the homeowner with contact information for both the permittee and the Department in the event a homeowner believes they may be adversely impacted.
- c) The permittee shall notify the Department of any adverse impact within 12-hours of receiving such information. Furthermore, the permittee shall provide potable water for drinking and cooking purposes to a well owner that the Department has determined to be adversely impacted. The permittee shall have 12 hours to provide drinking and cooking water after being notified of an occurrence of an adverse impact. The permittee shall provide potable water for other domestic uses within 36 hours of being notified of an adverse impact (e.g., lower well pump, install higher capacity well pump, drill a new well, or truck bulk water to the property). A permanent alternative water supply that produces water quality that complies with Federal and State drinking water requirements and a quantity of water that complies with the requirements of Env-Ws 388.18, shall be provided to an adversely impacted water users within 30 days of the Department determining that a water user had been adversely impacted.

Contracts with companies capable of providing water and well services (including drilling of new wells) must be developed and maintained prior to and after initiating the withdrawal such that in the event that impacts are noted at private wells, mitigation steps can be undertaken expeditiously. Copies of these contracts shall be provided to the Department prior to initiating the large groundwater withdrawal.

- d) Where the status of unanticipated impact is not clear, the permittee shall gather information needed to quantify the impact and determine its status relative to adverse impact criteria defined under Env-Ws 388.18 and provide this information to the Department within 48 hours of being notified by the Department. A verified adverse impact shall be mitigated as described in paragraph (c), above.
- e) The Department will routinely review the results of all monitoring data, and if water level monitoring data indicates that groundwater is being extracted at a rate that exceeds natural recharge on average, then the Department will modify the permit in accordance with Env-Ws 388 in order to prevent adverse impacts from occurring. In addition, the permittee shall operate the well in accordance with the management procedures described below:

STAGE I MANAGEMENT PROCEDURES:

In the event that any of the following monitoring triggers are exceeded, output from each production well shall be reduced to 75% of the permitted yield capacity:

Trigger A: A fifteen foot drawdown below the 180-day no-recharge projections (at locations and associated values listed in Table 1), unless it is determined by the Department that the drop in water levels in a specific monitoring point is erroneous based upon an analysis of water levels in all other similar monitoring points.

Trigger B: Moderate Drought Condition as determined by U.S. Drought Monitor which is administered by the U.S. Department of Agriculture, Department of Commerce, and National Oceanic and Atmospheric Administration.

Trigger C: An adverse wetland impact determination based upon the criteria of Env-Ws 388.18(c)(7) by the Certified Wetland Scientist completing the monitoring described in Section 4, or the Department.

As part of Stage I management procedures, the permittee shall increase the frequency of reporting of all on-site and off-site water level measurements to the Department, and submit all measurements electronically by the 15th and 30th day of each calendar month.

STAGE II MANAGEMENT PROCEDURES

In the event that any of the conditions listed below are exceeded, then output from each production well shall be reduced to 50% of the permitted yield capacity:

Trigger A: A twenty foot drawdown below the 180-day no-recharge projections (at locations and associated values listed in Table 1), unless it is determined by the Department that the drop in water levels in a specific monitoring point is erroneous based upon an analysis of water levels in all other similar monitoring points.

Trigger B: Severe Drought Condition as determined by U.S. Drought Monitor which is administered by the U.S. Department of Agriculture, Department of Commerce, and National Oceanic and Atmospheric Administration.

Trigger C: An adverse wetland impact determination based upon the criteria of Env-Ws 388.18(c)(7) by the Certified Wetland Scientist completing the monitoring described in Section 4 or the Department that is not corrected by Stage I.

As part of Stage II management procedures, the permittee shall increase the frequency of reporting of all on-site and off-site water level measurements to the Department, and submit all measurements electronically by the 15th and 30th day

of each calendar month.

STAGE III MANAGEMENT PROCEDURES

In the event that any of the following triggers are exceeded based on monitoring at the private wells outlined above, the cumulative withdrawal from all on-site wells shall be reduced to below 57,600 gallons over any 24-hour period.

Trigger A: A thirty foot drawdown below the 180-day no-recharge projections (at locations and associated values listed in Table 1), unless it is determined by the Department that the drop in water levels in a specific monitoring point is erroneous based upon an analysis of water levels in all other similar monitoring points.

Trigger B: Extreme Drought Condition as determined by U.S. Drought Monitor which is administered by the U.S. Department of Agriculture, Department of Commerce, and National Oceanic and Atmospheric Administration.

Trigger C: An adverse wetland impact determination based upon the criteria of Env-Ws 388.18(c)(7) by the Certified Wetland Scientist completing the monitoring described in Section 4 or the Department that is not corrected by Stage II.

As part of Stage III management procedures, the permittee shall increase the frequency of reporting of all on-site and off-site water level measurements to the Department, and submit all measurements electronically by the 15th and 30th day of each calendar month.

STAGE IV MANAGEMENT PROCEDURES

In the event that a monitoring report indicates that the withdrawals are adversely impacting wetlands and the adverse impacts will continue, withdrawals at the site shall cease.


7. Prior to initiating large groundwater withdrawals, the concentration of all contaminants in the overburden and bedrock aquifer associated with historic activities at the Just Cause Site at 155 Old Turnpike Road (DES#200302008) shall be remediated to concentrations below New Hampshire's Ambient Groundwater Quality Standards (AGQS) as set forth in Env-Wm 1403. Withdrawals at the USA Springs site may not be initiated until the Department has issued a "Certificate of No Further Action" for the Just Cause site in accordance with Env-Wm 1403.19.
 8. The permittee shall register its new sources of water under the Registered Water User Program and maintain the water use reporting requirements of Env-Wr 700 or its successor rules at all times.
 9. The permittee shall apply for renewal of this permit at least 90 days prior to its
-

expiration date. The permittee shall continue to comply with all conditions in this permit until the permit is renewed or the facility is closed in accordance with all applicable requirements, regardless of whether a renewal application is filed.

10. The permittee shall obtain new source approval for Bottled Water from the Department in accordance with Env-Ws 389 prior to initiating withdrawals at the site for the purpose of bottling water.

The issuance of this permit is based upon the analysis and findings described in the attached document dated July 1, 2004 and titled "Decisions and Findings Regarding USA Springs, Inc., Application for Large Groundwater Withdrawal Permit, December 29, 2003."

Any person aggrieved by any terms or conditions of this permit may appeal in accordance with RSA 541 within 30 days.

COPY


Michael P. Nolin, Commissioner
Department of Environmental Services

Table 1: Trigger Water Level Elevations for USA Springs Large Groundwater Withdrawal Permit 2004-003

Town Map/Lot Number	180-Day No-Recharge Drawdown	Stage I Trigger Level	Stage II Trigger Level	Stage III Trigger Level	Address
	(feet-NGVD)	(feet-NGVD)	(feet-NGVD)	(feet-NGVD)	
3-6	344	329	324	314	165 Old Turnpike Road
3-2	363	348	343	333	162 Old Turnpike Road
3-2-1	379	364	359	349	158 Old Turnpike Road
3-3	360	345	340	330	166 Old Turnpike Road
3-2A	365	350	345	335	164 Old Turnpike Road
2-7	341	326	321	311	181 Old Turnpike Road
2-5	357	342	337	327	187 Old Turnpike Road
2-8A4	381	366	361	351	186 Old Turnpike Road
3-11-15	370	355	350	340	3 Lincoln Drive
3-11-9	371	356	351	341	19 Lincoln Drive
3-12-1	370	355	350	340	86 Freeman Hall Road
14-16 ¹	0 ¹	Note 1	Note 1	Note 1	45 Garland Drive
14-18 ¹	0 ¹	Note 1	Note 1	Note 1	39 Garland Drive
7-2B-1	374	359	354	344	4 Wood Road
7-3-8	303	288	283	273	32 Wood Road

1. Static water levels for these wells shall be determined when monitoring initiates. Stage I, II and III trigger levels shall be adjusted based on the actual static water level in these wells.
2. If an alternative monitoring location is used as described in condition 5a of the permit, then the trigger levels shall be determined as described by footnote 1, above.

New Hampshire Department of Environmental Services

Decision and Findings

**USA Springs, Inc. Application for a Large Groundwater Withdrawal Permit Dated
December 29, 2004
Permit No. 2004-0003**

July 1, 2004

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 - Appendix 5 Department of Justice Informal Opinion on Issues Pertaining to International Trade.
-

INTRODUCTION

Below is a Decision and Findings Statement prepared for the approval of Large Groundwater Withdrawal Permit No. LGWP-2004-0003 issued to USA Springs, Inc (USA Springs). The approval of this large withdrawal permit is based on documents contained in the USA Springs permitting file. These files include documents submitted by USA Springs for a large groundwater withdrawal permit application and approval for a new source of bottled water that was denied by the New Hampshire Department of Environmental Services (Department) on December 11, 2003, including, but not limited to, the February 3, 2003 Final Report, Supplemental Information provided August 12, 2003, Supplemental Information included with USA Springs' Motion for a Rehearing dated September 11, 2003, Supplemental Information submitted by USA Springs on September 29, 2003, and Supplemental Information submitted by USA Springs on November 10, 2003. The USA Springs permitting file also includes documents USA Springs submitted in a new large groundwater withdrawal application including its Major Withdrawal Permit Application dated December 29, 2003, supplemental information submitted by USA Springs in a letter report dated February 24, 2004, and supplemental information submitted by USA Springs in a letter dated March 10, 2004. USA Springs also has referenced documents on file with the Department for the Harnum Waste Site (also referred to as the Just Cause Realty and K&B Realty site - waste site number 200302008). The file also includes numerous written comments submitted by the Towns of Nottingham, Barrington, and Northwood, and from members of the public.

This decision provides specific findings made by the Department on issues relevant to the legal and technical requirements of a large groundwater withdrawal permit that were contrary to comments or recommendations made by municipalities, USA Springs, and the general public. Accordingly, this decision statement addresses relevant technical concerns provided by the public as required by RSA 485-C:21, V.

1.0 BACKGROUND

On May 24, 2001, USA Springs submitted a permit application titled "Preliminary Initial Hydrogeologic Report for USA Springs' Proposed Bottled Water Wells and Spring" to the Department for a large groundwater withdrawal permit. The permit application proposed to withdraw up to 439,200 gallons per day from three bedrock wells and a spring. The permit application also included a description of the proposed withdrawal, a proposed withdrawal test design, a conservation management plan, and the results of the hydrogeologic testing that had been completed at the site to date. USA Springs completed testing and analysis in support of the May 24, 2001 large groundwater withdrawal application and submitted the results of this work in a Final Report dated February 2003. The Department denied the large groundwater withdrawal application and application for a new source of bottled water on August 12, 2003 (see Appendix 1). The application was denied on August 12, 2003 because USA Springs application did not meet several regulatory requirements for issues pertaining to both water quantity and quality. After the August 12th denial, USA Springs requested a rehearing. The Department granted the rehearing and then again denied the application on December 11, 2003. The December 11th denial was based only on issues pertaining to water quality. The Department found in Section 3 of the December 11th decision that USA Springs failed to demonstrate that its proposed withdrawal will not produce adverse impacts to surrounding private water supply wells from the contamination source on the Harnum Site, which is immediately adjacent to the site of USA Springs' large groundwater withdrawal. The Department also found that if such adverse impacts to the surrounding wells should occur, the effects would be immediate

and irreversible. The full text of the Department's December 11th decision is attached as Appendix 2 to this document.

On December 29, 2003, USA Springs submitted a new large groundwater withdrawal application. The large groundwater withdrawal permitting process follows the sequence summarized below as described by Env-Ws 388- Major Groundwater Withdrawal:

- 1) Permit Application - An applicant submits a preliminary large groundwater withdrawal permit application in accordance with Env-Ws 388.10, including the following:
 - a) Preliminary demonstration of need and proposed withdrawal volume.
 - b) Preliminary conservation management plan.
 - c) Preliminary delineation of study area including the maximum extent of the withdrawal's cone of depression; the maximum extent of the withdrawal's recharge area; and the withdrawal's downgradient area.
 - d) Preliminary list of water users and a water resources inventory.
 - e) Conceptual hydrologic model.
 - f) Identification of data gaps in the conceptual hydrologic model.
 - g) A proposed withdrawal testing design.
 - h) An estimate of the withdrawal's effects.
- 2) Public Notification - An applicant provides all municipalities and public water suppliers located in the preliminary study area of a proposed withdrawal with a copy of the preliminary application in accordance with RSA 485-C:14-a and Env-Ws 388.11.
- 3) Public Hearing - Pursuant to RSA 485-C:21, a municipality or water supplier located in the preliminary study area has 15 days after the receipt of notification to request that the Department conduct a public hearing. The public hearing must be conducted within 30 days of the request.
- 4) Forty-five Day Public Comment Period - A 45-day public comment period follows the public hearing. If a hearing is not requested, the 45-day public comment period follows the date that public notification occurred in accordance with RSA 485-C:21V. The Department considers all relevant recommendations and comments received during the 45-day comment period or at the public hearing.
- 5) Optional Pre-Testing Conference and Revised Withdrawal Testing Design - During the 45-day public comment period, the applicant may request a pre-testing conference and a Department walk-through of the proposed withdrawal site in accordance with Env-Ws 388.12. After a pre-testing conference and site walk-through, the Department must comment on the adequacy of the proposed withdrawal testing design for assessing impacts to existing water users and environmental resources. The applicant is strongly encouraged to revise the withdrawal testing design to address all of the Department's comments and relevant technical issues identified during the public comment period.

- 6) Withdrawal Testing - After revising the withdrawal testing design, the applicant conducts the withdrawal testing program in accordance with Env-Ws 388.13. Staff of the Department conducts site visits during withdrawal testing.
- 7) Final Report - After completing withdrawal testing, the applicant must submit a final report to the Department in accordance with Env-Ws 388.17. The report must contain the following:
 - a) Demonstration of need - A revised withdrawal permit volume - A revised permit volume may be requested provided the revised volume is less than or equal to the withdrawal volume demonstrated during withdrawal testing.
 - b) Final conservation management plan.
 - c) Revised list of water users and water resources inventory.
 - d) Revised delineation of the study area.
 - e) Revised conceptual hydrologic model based upon data collected during withdrawal testing.
 - f) A detailed description of the withdrawal testing.
 - g) A detailed analysis, including all calculations and collected data, that fully describes the withdrawal testing results.
 - h) A full assessment of impacts or potential impacts from the proposed withdrawal to existing water users or natural resources.
 - i) A proposed monitoring and reporting program designed to ensure that adverse impacts will not occur as a result of the proposed withdrawal.
 - j) A proposed plan, if necessary, to mitigate any potential adverse impacts.
- 8) Technical Review - The Department completes a technical review for a proposed large groundwater withdrawal within 45 days of receiving the final report. Using the adverse impact criteria in Env-Ws 388, The Department evaluates the permit application to verify that adverse impacts will not occur as a result of the proposed withdrawal.
- 9) Final Decision - If the permit application information demonstrates the withdrawal will not produce adverse impacts, the Department will issue a large groundwater withdrawal permit. If the permit application information indicates that an adverse impact may occur, but can be mitigated, a withdrawal permit shall be granted under the following conditions:
 - a) Sufficient information is provided verifying that any adverse impact will not be immediate and irreversible.
 - b) Adverse impacts can be prevented by mitigation.

c) A monitoring and reporting program is implemented as approved by the Department.

If insufficient permit application information exists for the Department to complete a technical evaluation, depending upon the proposed large groundwater withdrawal potential impacts, the Department will either:

- a) Issue a conditional approval contingent upon the results of monitoring and reporting requirements;
or
- b) Require that additional hydrogeologic testing be completed for the withdrawal prior to issuing a permit.

If an applicant fails to demonstrate that a proposed large groundwater withdrawal complies with the requirements of Env-Ws 388, then the Department will deny the large groundwater withdrawal permit.

During USA Springs' first large groundwater withdrawal application, the process described above was followed, except there were multiple iterations of submittals by USA Springs, comments provided by the public, and findings and decisions on various documents made by the Department on documents submitted by USA Springs (see the Department's December 11, 2003 denial letter in Appendix 2 for a detailed history).

During USA Springs' second permit application, USA Springs referenced work completed under its first application, and provided additional information pertaining to groundwater contamination and an updated list of private well owners located within the study area of the proposed groundwater withdrawal. The Department initiated the public hearing and written comment portion of the process and continued the public participation process until USA Springs submitted its Final Report (Step 7 in the permitting process). Also, at the February 5, 2004 public hearing, the Department stated that all public comments associated with all aspects of USA Springs' first application would be considered as part of the record for its second application.

The large groundwater permitting process is structured to identify and collect information about water users and water resources that may be adversely impacted. The rule is designed to give the applicant and potentially affected stakeholders an opportunity to share information before costly field-work and withdrawal testing is completed. Under Env-Ws 388, the Department has no authority to approve or deny any aspect of the application, except for the Final Report required by Env-Ws 388.17 in which the Department makes its Final Decision based on the decision making criteria of Env-Ws 388.23. The Final Report contains all the information contained in a preliminary application required by Env-Ws 388.10, except the information in a Final Report is supported and refined with data obtained from work associated with the withdrawal test required by Env-Ws 388.13. Therefore, the Department has allowed applicants for large groundwater withdrawal permit to fulfill the public notification and public hearing requirements by utilizing the Final Report required by Env-Ws 388.17. USA Springs' second application follows this approach, whereby the majority or all of the work required by Env-Ws 388 was completed (mostly as part of the initial application) prior to initiating and completing the public hearing and comment periods required by RSA 485-C:21.

2.0 PUBLIC NOTIFICATION AND INVOLVEMENT

In accordance with the provisions of RSA 485-C:21, USA Springs notified the Towns of Nottingham, Barrington, and Northwood of the second proposed large groundwater withdrawal application. All three towns requested that a public hearing be conducted pursuant to RSA 485-C:21, III.

Pursuant to RSA 485-C:21, IV, the Department held a public hearing for USA Springs' application on February 5, 2004 in the multi-purpose room at the Nottingham Town Offices. Prior to the public hearing, USA Springs posted and published notices as required by RSA 485-C:21, IV. Prior to opening the public hearing, the Department stated the public hearing would be continued as allowed by Env-C 205.08 until supplemental information was filed by USA Springs. The Department also stated prior to opening the hearing that it would consider all public comment provided during USA Springs' previous large groundwater withdrawal application as part of this application. During the permitting review process for USA Springs first large groundwater withdrawal application, the Department provided multiple opportunities for public comment and received extensive comments. Section 1.1 of the December 11, 2003 decision statement (Appendix 2) provided detailed information about the public involvement opportunities during USA Springs' first large groundwater withdrawal permit application. The Department accepted verbal testimony from all individuals wishing to provide information at the February 5th Public Hearing. The Department encouraged the public to submit written comments to the Department by March 22, 2004 as a follow-up to the February 5th hearing, but also made clear that there would be an additional opportunity to comment on the project once additional information was received.

In a letter dated March 10, 2004, USA Springs proposed a revised mitigation plan to address adverse impacts associated with contamination at the adjacent Harnum site. In its March 10th letter, USA Springs requested that the Department make a Final Decision on its large groundwater withdrawal application in accordance with Env-Ws 388.23. Upon receipt of this request, the Department reconvened the continued public hearing on April 7, 2004 at the same location as the February 5, 2004 hearing. Notice of the hearing was completed by direct postcard mailings to approximately 500 individuals who have submitted their names on letters or petitions to the Department regarding the USA Springs large groundwater applications, e-mails sent to stakeholders who have requested e-mail updates from the Department, and notice on a web page on the Department's website. The Department also faxed and e-mailed notices to the Towns of Nottingham, Barrington, and Northwood for posting. A regional newspaper also published news articles that advertised the April 7th public hearing in advance. The public hearing was closed upon completion of the public testimony on April 7, 2004. Following the close of the Public Hearing, a 45-day public comment period was established in accordance with RSA 485-C:21, V. The record on the public comment period was closed at the close of business on May 24, 2004.

3.0 REGULATORY DECISION-MAKING CRITERIA

The proposed withdrawal of 307,500 gallons per day by USA Springs for the purpose of producing bottled water is subject to two sets of rules. The first is N.H. Admin. Rules Env-Ws 388, Major Groundwater Withdrawal. The second set of rules, for developing a source of bottled water is Env-Ws 389-Groundwater Sources of Bottled Water. As part of its latest application, USA Springs has not requested new source approval for bottled water in accordance with Env-Ws 389, but has only requested a large groundwater withdrawal permit. As a condition of its large groundwater withdrawal permit, USA Springs is required to subsequently obtain approval for a new source of bottled water in accordance with Env-Ws 389. It is anticipated that USA Springs will request approval from the Department for new

sources of bottled water in accordance with Env-Ws 389 when contamination at the Harnum site is reduced to ambient groundwater quality standards as required by Condition 7 in the large groundwater withdrawal permit (LGWP-2004-0003) issued to USA Springs before the water supply production wells can be used.

Criteria for determining if a proposed large groundwater withdrawal must be approved or denied are contained in Env-Ws 388.23. This rule states in relevant part the following:

Env-Ws 388.23-Procedure and Criteria to Issue, Deny, or Suspend a Major Withdrawal Permit

- (b) *The department shall issue or renew a major withdrawal permit described pursuant to Env-Ws 388.23 under the following circumstances:*
- (1) *When information in the report produced in accordance with Env-Ws 388.12 is complete and correct; and*
 - (2) *When the information in the report produced in accordance with Env-Ws 388.17 demonstrates the withdrawal will:*
 - a. *Not produce adverse impacts; or*
 - b. *Result in impacts that can and will be mitigated, provided:*
 1. *There is sufficient information to verify that any adverse impacts that occur as a result of the withdrawal will not be:*
 - (i) *An adverse impact that may occur immediately; and*
 - (ii) *An irreversible impact; and*
 2. *A monitoring and reporting program is implemented in accordance with Env-Ws 388.20.*
- (c) *The department shall not issue a new, or renew an existing major withdrawal permit if it is demonstrated that a withdrawal will result in adverse impacts which cannot or will not be mitigated.*
- The definition of "adverse impact" is contained within Env-Ws 388.18 as follows:
- Env-Ws 388.18 - Adverse Impact Criteria.
- (c) *For all major withdrawals, adverse impacts shall include the following:*
- (1) *A reduction in the withdrawal capacity of a private water supply well of a single residence as a result of the reduction of available water that is directly associated with the withdrawal, including:*
-

- a. Any reduction in capacity for wells with a capacity less than water well board recommended optimum minimum flow capacity of 4 gallons per minute for 4 hours before the withdrawal;*
 - b. A reduction in capacity below 4 gallons per minute for 4 hours, for wells that had a capacity greater than 4 gallons per minute for 4 hours, before the withdrawal; or*
 - c. A reduction in capacity where the well still has a capacity between 4 gallons and 10 gallons per minute for 4 hours and the user provides information indicating that the reduction in flow has resulted in the inability to meet their water needs;*
- (2) *A reduction in a public drinking water supply below the minimum withdrawal rates required per consumer determined by the following:*
 - a. Minimum daily amounts of drinking water shall be determined per use based on the design flow criteria established for public water supply systems under Env-Ws 372; or*
 - b. Where it is verified that such wells were unable to produce the design flow before the withdrawal began, the adverse impact shall be any reduction in the ability to produce water;*
- (3) *A reduction in a water supply that is used for a multiple unit dwelling residence, but that is not a public water supply, that results in the inability to continue established activities or maintain existing water capacity requirements;*
- (4) *A reduction in a private, non-residential, non-drinking water supply that results in the inability of a commercial, industrial or retail facility to continue established services or production volumes;*
- (5) *A reduction in the ability of a registered water user to produce volumes equivalent to the average daily withdrawal for a specific calendar month as determined by discharge measurements and reports made to the department in accordance with the water user requirements under Env-Wr 700;*
- (6) *Reduction in surface water levels or flows that will, or does cause a violation of surface water quality regulations set forth in Env-Ws 1700;*
- (7) *A net loss of values for submerged lands under tidal and fresh waters and its wetlands as set forth in RSA 482-A;*
- (8) *The inability of permitted surface water or groundwater discharges to meet permit conditions;*
- *(9) A reduction of river flows below acceptable levels established pursuant to RSA 483; or*

- (10) *The contamination of groundwater obtained from wells or surface waters from contaminated groundwater whose flow has been altered by the withdrawal.*

The large groundwater withdrawal rules establish a process whereby an applicant must identify impacts that a proposed withdrawal may cause (see Env-Ws 388.16(c)-(e)). The impact assessment must be completed assuming the proposed withdrawal operates at its maximum permitted withdrawal rate for 180 straight days. The impact assessment must be completed assuming no net recharge to the groundwater (not surface water) for 180 days, which is representative of the vegetative growing season when natural water availability is most scarce. If a withdrawal may cause impacts that meet the definition of "adverse impact" as defined by Env-Ws 388.18, then Env-Ws 388.17(c) requires that an impact mitigation program be prepared in accordance with Env-Ws 388.21(a). The rules (Env-Ws 388.17(c)) also require that an applicant propose an impact monitoring and reporting program in accordance with Env-Ws 388.20 when operating information is necessary to ensure adverse impacts do not occur. Env-Ws 388.20 further states that impact monitoring and reporting is required "when available information, including work completed in accordance with these rules, is not sufficient to verify that impacts from the large withdrawal will not occur, provided the available information does not suggest that an impact is: a) irreversible; or b) will occur immediately" (emphasis added). The rules provide for a comprehensive set of measures that bracket the risk of the occurrence of adverse impacts as defined by Env-Ws 388.18, and ensure that any adverse impact is analyzed.

Lastly, the large groundwater withdrawal rules contain provisions for a permit holder to mitigate unanticipated adverse impacts (Env-Ws 388.21(a)(3)) that may occur as a result of a withdrawal. The rules (Env-Ws 388.21(b)(3)) allow for the Department to establish conditions for mitigation for impacts as a condition within the large groundwater permit issued pursuant to Env-Ws 388.21.

4.0 EVALUATION OF COMPLIANCE WITH THE LARGE GROUNDWATER WITHDRAWAL PERMITTING REQUIREMENTS

4.1 Conceptual Hydrogeologic Model, Withdrawal Testing Data, and Impacts to Existing Water Users and Water Resources

4.1.1 Conceptual Model

In its February 2003 Final Report, USA Springs used data it obtained from published reports, the installation of borings and monitoring wells, application of geophysics, bedrock geology mapping, withdrawal testing and water level monitoring programs to develop a conceptual hydrogeologic model of the study area of the proposed withdrawal. In February 2003, USA Springs provided a conceptual model that it claimed reflected conditions of 180 days of no net recharge from precipitation to groundwater as required by Env-Ws 388.06(h), Env-Ws 388.14, and Env-Ws 388.16, but the analysis did not actually adjust field data to this no recharge condition. The analyses initially completed by USA Springs used data collected during the withdrawal test that included the effects of precipitation before and during the test. The Department described this deficiency to USA Springs in a letter dated April 11, 2003 (attached as Appendix 3 to this document), and in its Final Decision dated August 12, 2003. USA Springs then revised its analyses and submitted an addendum to its application on August 12, 2003, several hours after the Department issued its decision. The addendum provided by USA Springs corrected the analyses for the effects of precipitation and met the 180 day no net recharge condition required by Env-Ws 388.06(h), Env-Ws 388.14, and Env-Ws 388.16.

The hydrogeologic conceptual model described in USA Springs' February 2003 Final Report for its first large groundwater withdrawal application presented two conflicting conceptual models: (1) bedrock that is vertically insulated from the surficial overburden; and (2) bedrock that is rapidly recharged by precipitation events. These inconsistencies are described in more detail in the Department's August 12, 2003 Final Decision and letter dated April 11, 2003 (see Appendices 2 and 3 respectively). USA Springs used its hydrogeologic conceptual model as the basis for concluding that very limited environmental monitoring, reporting and mitigation would be required to address impacts to water users and water resources.

USA Springs never fully reconciled the contradictions in the conceptual hydrogeologic model put forth in its February 2003 Final Report. However, it did substantially revise its application in submittals it made in August 12, 2003 and September 11, 2003 in response to the Department's comments and acknowledged that contradictions exist in how data from the withdrawal test can be interpreted. USA Springs also proposed an environmental monitoring, reporting, and mitigation program to address uncertainties associated with its withdrawal test and potential impacts based upon a conservative "worst case" interpretation of data contained in its application. This approach ensures that no unmitigated adverse impacts occur as required by Env-Ws 388. The rules (Env-Ws 388.17(c)) require that an applicant propose an impact monitoring and reporting program in accordance with Env-Ws 388.20 when operating information is necessary to ensure adverse impacts do not occur. Env-Ws 388.20 further states that impact monitoring and reporting is required *"when available information, including work completed in accordance with these rules, is not sufficient to verify that impact from the large withdrawal will not occur, provided the available information does not suggest that an impact is: a) irreversible; or b) will occur immediately."*

4.1.2 Impact to Water Users

USA Springs monitored 30 private wells during the withdrawal test. Private wells were selected for monitoring based upon: 1) Proximity from the proposed withdrawal; 2) Orientation to the withdrawal; 3) Type of well; and 4) Accessibility as determined by the well owner. Representative well types were monitored to the south, west and east of the withdrawal site. No private wells exist within 8000 feet north of the USA Springs site, and therefore no private wells were monitored in this direction.

Submittals by USA Springs on August 12, 2003 and September 11, 2003 are collectively responsive to the Department's comments pertaining to potential impacts to other water users contained in the August 12, 2003 denial letter. In the submittal dated September 11, 2003, USA Springs proposed a monitoring, reporting, and mitigation program designed to proactively prevent adverse water quantity or water level impacts from occurring to private wells. The monitoring, reporting and mitigation program was developed considering that USA Springs wells are strongly interconnected with nearby water users. Therefore, it includes substantial monitoring and reporting in accordance with Env-Ws 388.20 as well as the development of a mitigation program in accordance with Env-Ws 388.21. The Department finds that USA Springs' final proposal adequately addresses the probable impacts of the proposed large withdrawal.

The monitoring, reporting, and mitigation plan proposed by USA Springs and additional requirements specified as conditions obtained in the large groundwater withdrawal permit 2004-003 (permit) utilize two approaches to prevent adverse impacts to other water users:

1. Water levels with withdrawal is 1388.18.

The location at proximity to the bedrock well), well monitoring, interconnected testing data but

If USA Springs and permit conditions and provide monitoring. Also, if water levels in the analysis of volumes by 25% depending on the requires a reduction not agree with the reduction in withdrawal significantly exceeds or a partially un justified to maintain

2. USA Springs is classified by the agencies (through 12, 2003 and September 11, 2003) during times of users may occur impacts and reduction permit, but with cumulative with Drought Monitoring Springs site.

The Department finds that will lower the water level also finds that the partial susceptible water supply initially dewatered. The continuous dewatering will ensure that the withdrawal continuous dewatering of

The hydrogeologic conceptual model described in USA Springs' February 2003 Final large groundwater withdrawal application presented two conflicting conceptual model is vertically insulated from the surficial overburden; and (2) bedrock that is rapidly recharged by precipitation events. These inconsistencies are described in more detail in the Department's 2003 Final Decision and letter dated April 11, 2003 (see Appendices 2 and 3 respectively). The Department used its hydrogeologic conceptual model as the basis for concluding that very limited monitoring, reporting and mitigation would be required to address impacts to water user resources.

USA Springs never fully reconciled the contradictions in the conceptual hydrogeologic model in its February 2003 Final Report. However, it did substantially revise its application in August 12, 2003 and September 11, 2003 in response to the Department's comment acknowledging that contradictions exist in how data from the withdrawal test can be interpreted. USA Springs also proposed an environmental monitoring, reporting, and mitigation program to address the uncertainties associated with its withdrawal test and potential impacts based upon a "worst case" interpretation of data contained in its application. This approach ensures that no adverse impacts occur as required by Env-Ws 388. The rules (Env-Ws 388.17(c)) require the applicant propose an impact monitoring and reporting program in accordance with Env-Ws 388.17(c) operating information is necessary to ensure adverse impacts do not occur. Env-Ws 388.17(c) that impact monitoring and reporting is required "when available information, including monitoring data, is not sufficient to verify that impact from the large withdrawal will not occur, provided the available information does not suggest that an impact is: a) irreversible or b) occur immediately."

4.1.2 Impact to Water Users

USA Springs monitored 30 private wells during the withdrawal test. Private wells were monitored based upon: 1) Proximity from the proposed withdrawal; 2) Orientation to the withdrawal site; 3) Type of well; and 4) Accessibility as determined by the well owner. Representative wells were monitored to the south, west and east of the withdrawal site. No private wells exist west of the USA Springs site, and therefore no private wells were monitored in this direction.

Submittals by USA Springs on August 12, 2003 and September 11, 2003 are collective responses to the Department's comments pertaining to potential impacts to other water users contained in the Department's 12, 2003 denial letter. In the submittal dated September 11, 2003, USA Springs proposed a monitoring, reporting, and mitigation program designed to proactively prevent adverse water quantity impacts from occurring to private wells. The monitoring, reporting and mitigation program was developed considering that USA Springs wells are strongly interconnected with nearby wells. Therefore, it includes substantial monitoring and reporting in accordance with Env-Ws 388.17(c) and the development of a mitigation program in accordance with Env-Ws 388.21. The Department finds that USA Springs' final proposal adequately addresses the probable impacts of the proposed withdrawal.

The monitoring, reporting, and mitigation plan proposed by USA Springs and additional conditions specified as conditions obtained in the large groundwater withdrawal permit 2004-003 address two approaches to prevent adverse impacts to other water users:

required by Env-Ws 388.21(b)(1) and (2). For instance, Env-Ws 388.21(b)(1) and (2) allow a permittee to have up to 14 days to develop a mitigation plan for Department review. The same rule allows the Department up to 60 days to review the mitigation plan. Condition 6 of the permit requires that USA Springs provide an alternative water supply for drinking and other potable uses within 12 hours of the Department determining that its withdrawals caused an adverse impact, and that potable water for other domestic uses be provided to an affected well owner within 36 hours. Condition 6 of the permit also requires that USA Springs provide a permanent alternative water supply to adversely impacted water users within 30 days of causing an adverse impact. Condition 6(d) requires that USA Springs complete the investigation and submit information to the Department regarding any alleged impact within 48 hours. Env-Ws 388.19 describes the processes that must be followed to investigate unclear or unanticipated allegations of adverse impact, but does not contain any specific schedules for completing adverse impact investigations. The Department has authority to establish schedules for mitigation pursuant to Env-Ws 388.21(b)(3) that are more stringent than the default mitigation timelines set forth in Env-Ws 388.21(b)(1)-(2).

The Department also has further authority under RSA 485-C, Env-Ws 388.23 and Env-Ws 388.25 to modify, suspend, or revoke a permit if needed to further ensure adverse impacts to private water users do not occur.

4.1.3 Impacts to Existing Water Resources

During the withdrawal test, 36 monitoring points at approximately 18 monitoring locations were monitored to assess how USA Springs' proposed withdrawal might impact wetlands and surface water bodies. Wetland and surface water bodies were selected for monitoring based upon: 1) Proximity from the proposed withdrawal; 2) Orientation to the withdrawal; 3) Type of functions and values supported by a wetland; and 4) Accessibility as determined by the land owner.

Submittals made by USA Springs on August 12, 2003 and September 11, 2003, together were responsive to the Department's comments pertaining to impacts to water resources contained in its decision to deny the permit on August 12, 2003. In two submittals dated September 11, 2003, USA Springs proposed a monitoring, reporting, and mitigation program designed to proactively prevent adverse water quantity or water level impacts from occurring to water resources such as wetlands. The monitoring, reporting and mitigation program was developed considering that USA Springs' wells may be strongly interconnected with nearby water resources.

The Department finds that USA Springs' final proposal adequately addresses the probable impacts of the proposed large withdrawal to water resources (wetlands and surface water bodies). The monitoring, reporting, and mitigation plan proposed by USA Springs and amended by the conditions contained in the large groundwater withdrawal permit, utilizes four approaches to prevent adverse impacts to water resources. First, USA Springs is required to measure and assess if the large withdrawal is affecting the groundwater or surface water level in, around or beneath wetlands. Second, USA Springs is required to complete bi-weekly soil moisture, monitoring and to report this data to the Department once a month. Third, USA Springs must visually inspect and photograph six designated wetland plots within the zone of influence of USA Springs withdrawal. USA Springs is also required to monitor two additional wetland plots as control points beyond the influence of the proposed withdrawal at USA Springs. Wetlands that are representative, most susceptible to the withdrawal, and highly valued have been selected for monitoring sites. Fourth, USA Springs is required to tri-annually make a comprehensive assessment and

determination as to whether its large withdrawal is potentially adversely impacting wetlands. If the withdrawal is causing an actual or alleged adverse impact, USA Springs will be required to investigate the impact, report it to the Department, and provide mitigation on a schedule specified in the permit. These requirements are more stringent than the rules (Env-Ws 388.21) require. The Department has also required stream gage monitoring as Condition 5(c) of the large groundwater withdrawal permit. Additionally, as described in Section 4.1.2, USA Springs will be required to significantly reduce withdrawals in response to precipitation trends when the Federal government declares a moderate, severe, or extreme drought even if data and analyses suggests no adverse impact is anticipated.

4.2 *Demonstration of Need/Conservation Management Plan*

RSA 485-C:4, XII(b) requires that an applicant develop a conservation management plan that demonstrates a need for the proposed withdrawal. The Department adopted rules (Env-Ws 388.05) to establish the water conservation requirements required by RSA 485-C:4, XII(b). The Department finds that the information contained in USA Springs' February 2003 Final Report and supplemental material dated September 11, 2003 adequately: 1) Demonstrates a need for the proposed withdrawal; and 2) Demonstrates water will be utilized in an efficient manner, as required by Env-Ws 388.05. The Department will complete spot inspections of the facilities to monitor the efficiency of water use at the site. Conditions 3, 4, and 11 of the large groundwater withdrawal permit further ensure that USA Springs will utilize water efficiently. Conservation measures that USA Springs must implement include optimizing water treatment processes, utilizing efficient bottle filling technology, completing routine leak detection surveys, utilizing water efficient fixtures, and utilizing automatic process shut-off devices to minimize water use.

4.3 *Issues Associated with Groundwater Contamination*

Contamination has been identified in the shallow overburden, deep overburden, and bedrock aquifer at the Harnum/Just Cause Realty site in concentrations that exceed the ambient groundwater quality standards set forth in Env-Ws 1403. The groundwater contamination exists in an area fully encompassed by the zone of influence caused by USA Springs' proposed large groundwater withdrawal under pumping conditions.

The withdrawal testing program demonstrated that the pumping of USA Springs' wells caused the greatest amount of off-site drawdown in private water supply bedrock wells to the west of the USA Springs' site along Route 4. The contaminated Harnum site is located directly between USA Springs' pumping wells and these private bedrock water supply wells. All eight of the bedrock wells monitored along Route 4, west of USA Springs' pumping wells showed a significant, definitive response to pumping. The estimated 180 day, no net recharge drawdown caused by USA Springs' withdrawal in the private bedrock water supply wells ranges from 14 to 55 feet (median drawdown - 27 feet, average drawdown - 33 feet). These are significant drawdown levels that indicate a direct hydraulic connection between these wells and USA Springs' pumping wells. Although no wells were monitored at the Harnum site during the withdrawal test, available data demonstrate that water levels of the bedrock aquifer will be preferentially altered underneath the contaminated Harnum site by USA Springs' pumping wells, thus altering the natural flow direction and velocity of contaminated groundwater. In its submittals associated with the first large groundwater withdrawal application, USA Springs proposed to design and construct a

system to contain and remediate groundwater contamination that would operate simultaneously with the production wells at USA Springs. USA Springs stated that it could contain groundwater contamination while operating the well at USA Springs. In its August 12, 2003 and December 11, 2003 decisions, the Department found that USA Springs failed to demonstrate that its proposed withdrawal would not produce adverse impacts to surrounding private water supply wells from the contamination source on the Harnum Site. The Department also found that if such adverse impacts to the surrounding wells should occur, the effects would be immediate and irreversible. Consequently, the Department denied the first Large Groundwater Withdrawal Permit application in accordance with Env-Ws 388.23(b) and (c) on December 11, 2003.

In the second (current) application for a large groundwater withdrawal permit application, USA Springs proposes a mitigation program that reduces the concentration of groundwater contamination below ambient groundwater quality standards prior to initiating any large groundwater withdrawals at USA Springs. The Department finds that this mitigation plan for addressing groundwater contamination will ensure that USA Springs does not alter the flow of contaminated groundwater, because contamination will be removed prior the pumping of the USA Springs wells. Because the Harnum site is the only uncontrolled contamination source within the zone of contribution of USA Springs's withdrawal, and the permit states that no pumping of USA Springs' wells may occur until contamination is remediated, the Department finds that USA Springs's withdrawal as permitted will not alter the flow of contaminated groundwater as described by Env-Ws 388.18(c)10.

5.0 COMMENTS THE DEPARTMENT HAS RECEIVED CONTRARY TO THE ISSUANCE OF A LARGE GROUNDWATER WITHDRAWAL PERMIT

The Department has received hundreds of letters, several petitions, and extensive verbal testimony from individuals, communities and organizations opposing USA Springs' Large Groundwater Withdrawal Application. The majority of the letters provide simple statements of opposition to the USA Springs Large Groundwater Withdrawal Application, and do not state specific concerns about the application or legal and technical reasons the permit should be denied. However, many comments provided to the Department do provide detailed technical or legal comments and recommendations. Most of these comments and recommendations are contrary to the final decision of the Department to issue a large groundwater withdrawal permit. In accordance with RSA 485-C:21, V, the Department specifically considered all relevant comments and recommendations made and issues the additional findings below in support of its decision.

Many different stakeholders provided similar comments and recommendations regarding USA Springs' large groundwater withdrawal application. The Town of Nottingham and Barrington often provided the most detail when submitting their comments. Their comments often encompass all of the concerns submitted by others in regards to a specific aspect of the USA Springs large groundwater withdrawal application. When this is the case, the Department repeats the comments of the towns of Barrington and Nottingham in their entirety and then provides detailed findings.

5.1 Insufficient Groundwater at the Site

Several comments and recommendations stated that there is insufficient groundwater flow beneath the site to support the requested withdrawal rate. These comments and the Department's response are arranged by topic in this section.

Nature and Magnitude of the Bedrock Recharge

Several comments and recommendations made to the Department stated that USA Springs has not adequately estimated or assessed the nature and magnitude of recharge. Dr. Thomas Ballesterio provided the following comment shown in italics on behalf of the Town of Nottingham (Nottingham) on May 21, 2004:

"The conceptual model proposed by the applicant, since the inception of this project, is that the bedrock receives substantial recharge from precipitation. This has always been their assumption, and never once demonstrated by data. In fact their own water level and precipitation data plus consultant conclusions clearly show the opposite: the bedrock receives very little recharge from precipitation. Data that demonstrate that the bedrock receives very little annual recharge includes: the pre-pumping test water level data, pre-pumping test meteorological data, the pre-pumping test bedrock piezometric map, and the observed drawdowns during the pumping test. On various occasions, the applicant was advised to sample ground water and analyze it in order to determine its age and source. This was never done.

The first way to determine bedrock recharge from precipitation is to look at how bedrock well water levels respond to precipitation. All of the geologic cross sections presented by the applicant (for example, Figures 3-4, 3-5, and 3-6 of the 3 February 2003 Gradient report) depict a bedrock system that is confined: everywhere the water level in bedrock wells exists well above (10 feet or more) the top of the bedrock. This is an artesian (confined) aquifer system: a system in which everywhere the water pressure exceeds atmospheric pressure. Therefore when precipitation occurs and water levels in bedrock wells rise, the precipitation recharge water is not filling pore spaces (they are already filled). In this case, the recharge water goes into the storage compartments defined by the storage coefficient. The storage coefficient is the parameter that describes the characteristics of water storage in confined aquifers, and it is determined by pumping tests. The USA Springs pumping tests (step tests and pumping test) as well as the MykroWaters pumping tests (27 February 2004 MykroWaters Withdrawal Testing Report, Part - One) yield similar values for the storage coefficient of 3×10^{-4} . This low value of the storage coefficient underscores that the bedrock is a confined hydrogeologic system. The two storage compartments of the storage coefficient are: increased water density (much like overfilling a soccer ball with air) and expansion of the pore space (how the soccer ball expands as it is overfilled with air). The pre-pumping test meteorological and water level data (3 February 2003 Gradient Report) reflect that bedrock groundwater levels rise about 0.5 feet for every inch of precipitation. For a watershed-average annual precipitation of 42 inches, times the 0.5 ft/inch rise times the storage coefficient, the annual bedrock recharge from precipitation computes to be 0.08 inches per year. At this rate, if all of the bedrock recharge over the entire 14.4 square miles of the study area flowed under the USA Springs wells (which it does not), this would be less than 55,000 gallons per day: far less than the requested pumping amount. In comparison, the USA Springs request of 309,600 gpd from the 14.4 sq. mi. study area equates to 0.45

in/year: almost six times the amount of the recharge! The reality is that if 8 inches per year of precipitation were to occur in this bedrock (as assumed by the applicant), the only way for it to move through the bedrock is to have the groundwater gradient be almost two orders of magnitude higher. The bedrock piezometric map does not reflect such a gradient. The recharge must occur over a large area: it is physically impossible for it to occur in just a few isolated fractures (such fractures have not been identified, nor has there been demonstrated a connection to such fractures if they did exist).

Another way of determining the bedrock recharge is to look at what naturally flows under the site (emphasis added). Using the bedrock piezometric map (3 February 2003 Gradient report) and the range of hydraulic conductivities from the step tests, the pumping tests, or the remedial studies (27 February 2004 MykroWaters report), application of Darcy's Law allows an estimate of ambient bedrock flow. From the piezometric map, the bedrock ground water gradient at the location of the USA Springs wells is 0.016 and the contour length through the property (the 400-ft MSL elevation contour) is 3,800 feet. The range of hydraulic conductivities for the bedrock found by MykroWaters was 10.9 to 345 ft²/day with a median value of 35 ft²/day. The USA Springs pumping test yielded a median transmissivity value of 275 ft²/day with a range of 101 to 535 ft²/day. Therefore the range of ambient flows under the site is 16,000 gpd to 125,000 gpd. Interestingly, the 11 December 2003 MykroWaters Combined Remedial Action Report used this same method to yield a bedrock flow of 300 gpd/100 ft of contour, translating to 11,400 gpd below the USA Springs site. These ambient groundwater flows are consistent with each other and consistent with the estimated bedrock recharge from precipitation presented in the last paragraph. As presented in Section 3 of this report, this bedrock looks very isotropic on the large scale, and therefore there is very strong merit to the argument presented here (porous media analogy). The fact that this is a bedrock system does not invalidate the methods because on the scale of these calculations, the system performs as a porous media. If the argument is posited that the majority of flow in bedrock systems is in a few, highly transmissive fractures, and therefore porous media concepts do not apply, then some measure of rationale must be offered in their stead. No such explanations of bedrock recharge have been offered by the applicant, only an unsubstantiated assumption (8 inches per year of recharge) that has no reference. In fact, the reference cited by the applicant (USGS WRIR 98-4232) for the recharge rate to till overburden, basically states that the amount of bedrock recharge is insignificant. All of the applicants data presented to date has not demonstrated that few, highly transmissive fractures are the source of groundwater to their wells nor dominate the bedrock hydraulics. Therefore there is even less documented basis to use fractured media arguments than the porous media arguments. What is important in this section is that both the method of estimating precipitation recharge (55,000 gpd for the entire 14.4 mi² study area) and flow net method (16,000 to 125,000 gpd), are consistent in identifying that there is insufficient bedrock ground water recharge to sustain a pumping of 309,600 gpd. One may ask then, "How did the pumping test manage to pump at the rates (upwards of 300 gpm) that it did?" A simple answer is that even a bathtub can deliver 300 gpm: of course not on a sustained basis. The pumping test created an enormous amount of drawdown: tens of feet of draw downs in domestic wells thousands of feet away! If one contours the cone of depression from drawdown measurements at the end of the pumping test and calculates the amount of dewatering, it is apparent that most of the pumped ground water came from dewatering of the bedrock. Dewatering and no sustainable recharge are further supported in Section 2 on bedrock hydraulic characteristics and Section 3 on sustainability.

The applicant believes that its conceptual model is conservative (11 September 2003 Gradient Supplemental Information). Yet the data presented here, data collected by the applicant, clearly

demonstrates that the applicant has grossly misrepresented the recharge to the bedrock as well as water availability at the site. The applicant has not refined its original conceptual model to incorporate what the pumping test data reveals and therefore the applicant has not complied with Env-WS 388.04.c.10 nor Env-WS 389.07.11. The applicant has also not demonstrated that the requested withdrawal is sustainable and therefore has not complied with Env-WS 378.10.b.1. In light of these facts, it is recommended that NH DES find that the applicant has failed to demonstrate that there is sufficient quantity of water available such that its proposed withdrawal can be sustained without adverse impact and that the applicant has not complied with Env WS 388. Therefore this application should be denied.

Because USA Springs has not requested approval for a new bottled water source in accordance with Env-Ws 389, the Department makes no findings regarding Nottingham's recommendation pertaining to Env-Ws 389.07.11. Similarly, USA Springs is not seeking a new source of water for a small community water system. Therefore, the Department makes no findings pertaining to Env-Ws 378.10(b)(1) as recommended by Nottingham. The Department finds that USA Springs complied with Env-Ws 388.04(c)10 and developed an adequate conceptual model that reasonably reflects aquifer conditions as described in Section 4.0 of this decision. The Department finds that USA Springs complied with the criteria for issuing a large groundwater withdrawal permit described in Sections 3.0 and 4.1, above.

Nottingham has recommended that the recharge rate for the bedrock aquifer at the USA Springs withdrawal site should be 0.08 inches per year based on its own analyses of the withdrawal test data. This is not consistent with bedrock recharge rates typically estimated for bedrock aquifers in similar geologic settings. Nottingham states it derived its estimate of recharge using the data USA Springs provided in its submittals. As explained below, the Department finds the method Nottingham used to analyze the data to be inappropriate for this application. Nottingham acknowledges that the bedrock aquifer, immediately prior to the test, was confined (it is semi-confined during pumping which Nottingham does not acknowledge), as indicated by the measured water levels in the bedrock wells that were above the elevation on the bottom of the overlying overburden aquifer. Nottingham applied a method (the Water Table Fluctuation Method) to estimate recharge that is almost never valid for either confined or bedrock aquifers. Therefore its estimate indiscriminately fitted hydrogeologic data to available mathematical solutions that are not valid when applied to the USAS Springs permit application.

Nottingham calculated the storage coefficient of the confined bedrock aquifer using data in USA Springs' submittal, then assumed that the storage coefficient was equivalent to the specific yield of the aquifer to estimate recharge to the bedrock aquifer. The Department does not concur with Nottingham's analysis because it applies an inappropriate mathematical solution to estimate the specific yield for the confined aquifer. By definition a confined aquifer is not dewatered and therefore the term specific yield is not applicable.

Determining Sustainable Withdrawal Rates Using Flow-Nets and Darcy's Law

Nottingham recommends that the sustainable withdrawal rate at the USA Springs site can be determined by what naturally flows under the site as estimated by using Darcy's law. The Department does not

agree. State law and rules do not regulate groundwater withdrawal volumes based upon the amount of water that flows beneath a "site" under ambient (natural) conditions. In fact, the vast majority of existing large groundwater withdrawals extract more water than what naturally flows beneath the "site" in which they are located. Section 3, above describes in detail the criteria for approving or denying a proposed withdrawal under state laws and rules adopted by the Department.

Nottingham recommends that the withdrawal volume for USA Springs be determined based on the amount of water that flows beneath the site under ambient conditions. The Department disagrees. Nottingham stated the following in its recommendations on April 7, 2004: *"The reality is that the requested pumping rate of 309,600 gpd far exceeds the amount of water that naturally flows under the site. A sustainable pumping rate is one that is less than the total ambient groundwater flow rate minus the needs of individual down gradient homeowners and wetlands. The projected sustainable rate should also consider future upgradient uses. Such a rate, based on the data presented here, should only be a portion of the 200,000 gpd currently flowing under the site."* In the field of hydrogeology, a "sustainable withdrawal rate" is generally meant to mean the amount of water which can be withdrawn without producing undesired or adverse effects. In New Hampshire, RSA 485-C and Env-Ws 388.18 have defined qualitative and quantitative criteria for adverse impacts. Nottingham's suggestion that it is typical for sustainable withdrawal rates to be developed based upon ambient flow beneath a site is inconsistent with standard practice. In fact, the Department is not aware of any well (private or municipal) that has been developed based upon these criteria. The volume of groundwater flow at a "site" can be much higher under pumping conditions than it would be under ambient conditions due to gradient changes under pumping conditions and regional hydrogeology.

For Darcy's law to be applicable, the geological formation must exhibit the following characteristics: i) Aquifer zones must be homogeneous; ii) Aquifer zones must exhibit an isotropic hydraulic conductivity; and iii) Flow within the aquifer must be steady, laminar and irrotational. Generally only porous, unconsolidated material meets this criteria. The Department finds that the bedrock aquifer beneath the USA Springs site does not exhibit any of these characteristics. Data obtained from the withdrawal test demonstrate the bedrock aquifer at the USA Springs site is not homogeneous or isotropic, and strong preferential drawdown trends are clearly evident in bedrock monitoring well sites located in the shallow and deep bedrock both near and far away from the withdrawal site (see Figures 3-13 and 3-14 dated 08/04/03 and submitted on August 12, 2003). Water derived from wells at the USA Springs site comes from a small number of discrete fracture zones (see Table 1 of USA Springs' July 2003 report), and the bedrock at the site is not highly fractured. A high volume of water had to flow through a small number of large fractures during the withdrawal test (which discharged at least 307,500 gallons per day). Consequently, the laminar flow assumption required for Darcy's law to be applicable is violated. Lastly, because the bedrock is not fractured uniformly in the vertical or horizontal direction, rotational flow very likely only occurs in close proximity to the well

Nottingham's consultant made the argument to the Department verbally and in his comments on May 21, 2004 that flow nets and Darcy's law could be applied to the USA Springs site because at a large scale bedrock behaves as a porous medium. The Department agrees at large scales, bedrock may behave as a porous medium. However, Nottingham has applied these methods at a small scale, the USA Springs site, where this is not the case. Furthermore, available data shows that the hydrogeology of both the USA Springs site and the subwatershed in which the USA Springs site is located does not support the assumption that this bedrock aquifer behaves as a porous medium. For this to be demonstrated, the following assumptions would have to be true: 1) Fractures within the bedrock aquifer must be dense; 2)

Fracture openings in bedrock rock must be constant rather than distributed; 3) Orientations of fractures must be distributed rather than constant; and 4) A large number of data points must be tested.

Data obtained from the withdrawal testing program do not support the assumption that the bedrock aquifer at the USA Springs site or in the subwatershed behaves as a porous medium for the following reasons:

- 1) Time-drawdown curves for observation wells located in two or more different directions from pumping wells did not exhibit a similar shape. However, observation wells located in different directions showed very different shapes. Bedrock wells at similar distances from the pumping wells were strongly connected to the USA Springs withdrawal in some cases, and almost completely isolated from the effects of the withdrawal in others (see Figure 3-13 dated August 4, 2003). This indicates that the porous media assumption is violated.
- 2) The zone of influence created by the withdrawal did not appear as circular or elliptical shapes. The zone of influence created by USA Springs' withdrawal is very irregular and indicative of a failure in the porous media assumption (see Figure 3-13 dated August 4, 2003 and submitted on August 12, 2003).
- 3) Potentiometric (water table) map for a bedrock aquifer did not show a smooth and continuous water-table surface without areas of rapidly changing or anomalous water levels. The potentiometric surface for the USA Springs site has a stair-step appearance which indicates the bedrock aquifer is more sparsely fractured. and
- 4) Bedrock well yields are not consistent. Figure 3-9 in the February 2003 Final Report and data obtained from extraction wells at the Just Cause site demonstrate that well yields are highly variable throughout the region.

Nottingham states that it completed a flow net analysis in order to estimate the amount of water that flows beneath the USA Springs site. Nottingham has not provided the Department with the details of its analysis, however. In order to apply this method, , the following criteria must be satisfied:

- 1) Flow lines must be drawn perpendicular to equipotential lines;
- 2) Equipotential lines meet no-flow boundaries at right angles;
- 3) Equipotential lines parallel constant head boundaries;
- 4) The aspect ratio of the shapes formed by intersecting flow and equipotential lines must be constant (for example if squares are formed, the flow net must be squares throughout); and
- 5) Each flow tube will represent the same discharge.

Nottingham has not submitted its flow net analysis and therefore it is unclear if its analysis meets any of these criteria.

Applying Just Cause Realty Data to USA Springs

Nottingham cites data submitted to the Department from the Harnum/Just Cause Realty site as proof the proposed withdrawal is not sustainable. The Just Cause Realty site estimated the amount of water that would need to be extracted to create a 100 foot wide capture zone by a remediation well. The purpose of this calculation was not to determine the sustainability of a withdrawal, but to determine the withdrawal rate required to alter the flow direction of contamination such that a remediation well would capture contaminated groundwater. This evaluation does not demonstrate the potential sustainable withdrawal rate or the potential rate of recharge to the bedrock aquifer.

Using Groundwater Dating to Determine Recharge at USA Springs

Nottingham describes USA Springs' Final Report and addenda as ignoring how recharge occurs in the bedrock and where the water is stored. As explained below, the Department finds this comment to be inaccurate. Nottingham also states that the report is silent on the travel time of the recharge (e.g. how long it takes rainfall to infiltrate through the soil and reach the bedrock). The Department finds this comment to be partially accurate. USA Springs estimates that eight inches of precipitation recharges bedrock per year. No attempt was made to determine how quick and how much water from each separate precipitation event recharges the bedrock aquifer. Determining this value for a bedrock aquifer is: 1) Not practical and inconsistent with industry practices for siting groundwater withdrawals; and 2) Not specifically necessary for the Department to issue a permit in accordance with Env-Ws 388.

USA Springs recognized that its proposed bedrock withdrawal captures water from surface water boundaries, and recharge from the overlying till. It also recognizes that water derived from the bedrock aquifer is stored in the bedrock aquifer, overlying till aquifer and surface water. USA Springs developed monitoring, reporting and mitigation programs to ensure that 1) Adverse impacts as defined by Env-Ws 388.18 do not occur; and 2) Any unanticipated impacts are mitigated in accordance with the requirements of Env-Ws 388.

The requirements of Env-Ws 388.06 and 388.14 require an applicant to determine the following:

- (1) The amounts and timing of precipitation, runoff, storage, recharge, and discharge;
- (2) The distribution and availability of water necessary to maintain natural resources, existing water uses, and the proposed withdrawal; and
- (3) The location and amounts of natural and artificial loss of water, consumption, discharge, and recharge of water to and from the study area.

An application incorporates this information into its hydrogeologic conceptual model. The hydrogeologic conceptual model is then used to determine if the inventory of water users and resources identified as part of Env-Ws 388.15 are adversely impacted in accordance with Env-Ws 388.16. Env-Ws 388.16(e) specifically requires that an applicant assess impacts to the extent necessary to 1) Determine if adverse

impacts might occur; and 2) Develop a monitoring, reporting and mitigation program. The Department finds that USA Springs' submittals have satisfied these requirements.

The Department is not aware of any instance in New England where the analysis of the exact timing of recharge associated with separate precipitation events is a regulatory requirement when a water supply is developed. In fact, it is standard industry practice to derive estimates of recharge rates for almost any aquifer from: 1) Published research relevant to a particular geologic setting; and/or 2) Monitoring data collected during the long-term operation of the withdrawal. The Department finds USA Springs' estimate of recharge to the bedrock aquifer to be of the same magnitude as recharge rates generally estimated based on standard industry practice for similar environments. The Department also finds that the large groundwater withdrawal permit contains numerous provisions to ensure compliance with Env-Ws 388 as described in Section 4.1 of this document.

Nottingham also states in its April 7, 2004 comments that all the field data point to a system that recharges very slowly recharged system and that the pumping test resulted in significant dewatering of the bedrock and the capture of water from wetlands. Some of the withdrawal test data showed USA Springs' withdrawal not to be connected with wetlands whatsoever. Furthermore, USA Springs' impact analysis is conservative in that it does not account for storm water capture in the wetlands. While the rules required that USA Springs complete adverse impacts assessment under the condition of no recharge to the groundwater for 180 days (Env-Ws 388.06(h) and Env-Ws 388.16), there is no requirement to assume that surface water bodies do not receive direct precipitation or run-off for 180 days. The adverse impact analysis completed by USA Springs and presented in its August 12, 2003 and September 11, 2003 submittals assumes no rainfall at all for 180 days, making it more conservative than required by Env-Ws 388.16. USA Springs' proposed monitoring, reporting, and mitigation programs is based on this conservative analysis of the data obtained from the withdrawal test. These programs have been incorporated into the large groundwater withdrawal permit as conditions with slight amendments.

Nottingham has stated in its May 21, 2004 and April 7, 2004 comments that a more accurate method of determining how much and how fast precipitation reaches the bedrock is to use chemical fingerprints, especially those that can assist in aging the bedrock groundwater. Nottingham's consultant states that it is his experience in the Seacoast Region of New Hampshire that bedrock groundwater is very old, on the order of thousands of years old (based on groundwater dating with environmental isotopes). Nottingham's consultant has stated that the water age could be used to determine when that water was recharged into the bedrock aquifer and how rapidly current precipitation events would replenish the aquifer. The Department finds that dating the groundwater to determine the sustainability of the USA Springs' proposed withdrawal would not be appropriate for several reasons.

(1) Estimating either the age of groundwater or the rate of recharge in a confined/semiconfined bedrock aquifer such as the one USA Springs intends to extract water from is not sufficiently precise and is difficult to accomplish effectively. In unconfined porous media (overburden aquifers), the age of groundwater increases with depth at a rate that is controlled by aquifer geometry, porosity and recharge rate. The recharge rate to this type of aquifer can be determined by dating water at several points in a vertical profile. The bedrock aquifer that USA Springs will withdraw water from is confined when USA Springs' wells are not pumping. USA Springs would have to install a regional network of bedrock wells

sealed into the bedrock at discreet vertical and horizontal locations to obtain results that would likely have uncertain significance. The data derived from the dating of the water may not have any relevance to the groundwater flow regime that supports USA Springs' large groundwater withdrawal because of the inherent complexities of bedrock aquifers and their recharge.

(2) The recharge rate of an aquifer changes based upon stresses of the aquifer and changes with time. Under pumping conditions, the confined bedrock aquifer from which USA Springs extracts its groundwater will become semiconfined and therefore recharge will occur differently, and possibly include leakage from the overlying overburden aquifer. When USA Springs' wells withdraw water, it reduces the hydraulic head in the bedrock aquifer, which changes the vertical and horizontal velocity and direction of groundwater flow, thus changing the recharge rate and mechanisms of the aquifer. Therefore, the current age of the groundwater in the bedrock aquifer beneath the USA Springs site is not relevant to determining compliance with Env-Ws 388.18.

In the case of USA Springs' application, chemical fingerprints of the groundwater is: 1) Not required by Env-Ws 388; 2) Would not provide more reliable results than the tests USA Springs has already produced; and 3) Would require more work and associated expenses that would most likely produce ambiguous results as compared with other testing already required by Env-Ws 388.

Lastly, Nottingham's consultant states *"In my experience in the seacoast of New Hampshire, bedrock groundwater is very old, and on the order of thousands of years old (groundwater dating with environmental isotopes).* The most productive bedrock wells in New Hampshire sited to date are located in the Seacoast Region of New Hampshire. These withdrawals are being managed in a sustainable manner. Also, Professional Paper 1660 by the United States Geological Survey in 2002 has identified the Seacoast Region of New Hampshire as having the highest yielding bedrock aquifer in the state. This is true even though many of the water users in the Seacoast rely upon private wells and this area has experienced the highest rate of development of homes and private businesses in the state for the last 15 years. While some groundwater in the Seacoast region may be very old, this does not mean that bedrock withdrawals are not sustainable.

USA Springs' Estimate of Rate of Recharge

In its May 21, 2004 comments, Nottingham states that USA Springs provides no basis for its estimate of 8 inches per year of groundwater recharge to the bedrock aquifer. Nottingham explains that the reference (USGS WRIR 98-4232) USA Springs uses to justify an estimated annual recharge rate of 8 inches states *"that the amount of bedrock recharge is insignificant"*.

The referenced USGS document more fully states states:

"The estimates of mean annual ground-water recharge were compared to other groundwater recharge rates for subbasins primarily underlain by till and bedrock in Massachusetts and the rest of New England. The estimates of mean annual groundwater recharge at 11 long-term stations in and near the study area, where the aerial percentage of stratified-drift deposits

underlying the subbasins was less than 15 percent, were similar to the mean groundwater recharge rates (19.7 to 22.66 inches per year) (emphasis added) calculated by using RORA for 3 subbasins underlain by less than 28 percent stratified drift in southeastern Massachusetts and Rhode Island. Mean groundwater recharge rates determined in this study for subbasins underlain primarily by till and bedrock are higher than those previously reported for areas of New England, which range from 3 to 19 inches per year(emphasis added)."

This document states that recharge to bedrock may be significant and higher than historically estimated. USA Springs referenced the lower range of 3-19 inches per year of recharge to bedrock discussed in the report, and uses midpoint value (8 inches per year) of this range even though the USGS study was making the point that recharge could be higher.

Table 1 provides other published ranges of recharge estimates for crystalline bedrock in New England. The Department finds that USA Springs' assumed rate of 8 inches per year is reasonable and appropriate for this application. The Department finds Nottingham's recommendation of 0.08 inches per year as not appropriate for the bedrock aquifer that USA Springs will withdraw its water from and is inconsistent with published values.

Table 1: Published Ranges of Recharge Estimates for Crystalline Bedrock in New England.

Source	Title	Author	Recharge Estimate
Groundwater Vol 33, No. 6, 1995	"Simulations of Flow in Crystalline Rock and Recharge from Overlying Glacial Deposits in a Hypothetical New England Setting"	P. Harte and T. Winter	Probably 1-3 inches per year, not likely to exceed 4.5 inches per year
Groundwater, Vol 36, No. 4, 1998	"Characterizing a Groundwater Basin in a New England Mountain and Valley Terrain"	C. Tiedeman, D. Goode, and P. Hsieh	60% of the recharge to glacial deposits reaches the bedrock. This study in Plymouth, NH, assumes 28 inches of recharge to glacial deposits occurs each year meaning approximately 16.8 inches recharges the bedrock aquifer.

Table 1 (continued): Published Ranges of Recharge Estimates for Crystalline Bedrock in New England.

Source	Title	Author	Recharge Estimate
United States Geological Survey (USGS) "Water Resource Investigations Report (WRIR) 02-4290", 2003 WRIR also provides recharge estimates associated with other studies for fractured rock in the Northeast by the authors listed to the right. However, the Department cannot determine the type of bedrock associated with these sites.	Delineation of Water Sources for Public-Supply Well in Three Fractured Bedrock Aquifer Systems in Massachusetts	F. Lyford, C. Carlson, B. Hansen – USGS	West Newbury, MA 3-15 inches per year
			Maynard, MA – 24 inches per year
			Paxton, MA – generally 4.4 inches per year but up to 54 inches per year in low lying areas that capture run-off.
			Barton and others
			10-20 inches per year
			Lyford and others
			10.2-11 inches per year
			Teidman and others
			13 inches per year
			Wolcott and Snow
			8.45 inches per year

Sustainable Pump Rate

Nottingham uses the following analogy for the bedrock aquifer at the USA Springs site:
One may ask then, "How did the pumping test manage to pump at the rates (upwards of 300 gpm) that it did? A simple answer is that even a bathtub can deliver 300 gpm: of course not on a sustained basis."

The bedrock aquifer is recharged as discussed in Section 5.1 above, and Section 5.3 below. Furthermore, the conditions of the large groundwater withdrawal permit which are summarized in Section 4.1, ensure that the groundwater withdrawal will operate in a sustainable manner.

5.2 Hydraulic Characteristics

Several recommendations made to the Department state that USA Springs has not adequately estimated or assessed the nature and magnitude of recharge. Dr. Thomas Ballesterio provided the following comment on behalf of the Town of Nottingham on May 21, 2004:

The applicant consistently maintains that there is severe anisotropy in the bedrock system. However enough data does not exist to make or refute these claims (no bedrock observation wells to the northeast or to the west) and the data that does exist shows a much more homogeneous system than is being represented. In addition, there are other physical conceptual models that can explain the large-scale drawdown data rather than only anisotropy.

Figure 3-23 of the 3 February 2003 Gradient report plots the anticipated zone of influence after 180 days of pumping with no recharge. The applicant maintains that this zone of influence possesses a northwest-southeast linear appearance because of anisotropy that exhibits the highest hydraulic conductivity in this direction. This is consistent with part of the fracture rose diagram in the same figure. However, in that same rose diagram, there is a more dominant northeast to southwest fracture characteristic to the bedrock, and this can play a significant role in the actual zone of influence. Yet what appears in the figure is a very unrealistic zone of influence. For example, at USA-1 there is 447 feet of drawdown, and less than 500 feet to the northeast, drawdown is represented in the figure as ending. There is no justification presented for why the zone of influence does not extend much farther to the northeast: the absence of wells does not mean that there are no hydraulic effects. Similarly, overlaying the southwest fracture orientation from the rose diagram onto the USA wells would result in a large zone of influence to the southeast, yet none is represented by the applicant to occur. As in the northeast direction, the absence of observations to the southwest does not mean that there are no hydraulic effects. The applicant is not presenting a conservative approach in the delineation of the well head area. In public hearings prior to the pumping test, it was recommended to the applicant that more bedrock monitoring wells were needed to the northeast, west and southwest. These wells were not constructed. The applicant has therefore not complied with Env-WS 389.11.b.

The pumping tests performed by Mykro Waters during the remedial investigations generated interwell transmissivities for a variety of the wells in the vicinity of the contamination (27 February 2004 MykroWaters Report). The transmissivities from these tests were placed into a histogram (Figure 1). This histogram shows a remarkable degree of isotropy, more so than many overburden formations. Normally such histograms plot transmissivity or hydraulic conductivity on a logarithmic scale because they usually vary over several orders of magnitude in bedrock. For example, see various publications by Dr. Allen Shapiro on the Mirror Lake site in New Hampshire- slide 4.J. The highest value of transmissivity in the MykroWaters pumping test dataset is in the north-northeast direction, not aligned with the northwest to southeast direction of anisotropy represented by the applicant. Figure 22 of the 27 February 2004 MykroWaters report shows a zone of influence for the MykroWaters 72-hour pumping test. There is no reason that the 25-foot and 10-foot contours should not be drawn further to the southwest. It is notable that wells USA-1 and USA-2 saw almost the same drawdowns (9 ft. and 7 ft., respectively) and that they are to the northeast of the pumped wells in the 72-hour test. This is strong verification that the northeast to southwest direction will manifest large drawdowns in the event of large groundwater withdrawals at the USA Springs wells.

A very simple explanation for the linear shape of the zone of influence for the USA Springs wells is a well pumping in a formation that has a sloping piezometric surface. Linear- shaped zones of influence result. For example see the WHPA Users manual. Here, a linear zone of influence occurs in a completely isotropic medium, and the linearity of the shape of the zone of influence is controlled in part by the slope of the piezometric surface.

Figures 2 through 11 display measured draw downs in pumping, observation, and domestic wells during the USA Springs November 2002 pumping test. What is dramatic about this data is its similarity and uniformity of shape in each well. This is evidence that the formation is not as anisotropic as is portrayed by the applicant. In addition, it further substantiates the use of porous media arguments to describe recharge and bedrock hydraulics on the large scale.

The applicant has not used its data to refine the wellhead protection area and therefore has not complied with Env-WS 389.15. It is recommended that NH DES find that the applicant has failed to identify the zone of influence sufficiently to identify adverse impacts. Thus, the applicant has not complied with Env WS 389 and therefore this application should be denied.

Because at this time, USA Springs has not requested approval for a new bottled water source in accordance with Env-Ws 389, the Department makes no findings regarding Nottingham's recommendation pertaining to Env-Ws 389.

Although all of Nottingham's comments pertain to Env-Ws 389, the Department has provided technical findings below with respect to these comments.

Delineation of the Zone of Influence

First, Nottingham states that USA Springs did not have an adequate monitoring well network and therefore did not adequately estimate the zone of influence of the proposed withdrawal. Nottingham states that USA Springs had "no bedrock observation wells to the northeast or west". This is not accurate. USA Springs monitored six private bedrock wells to the west-southwest of the site, and four bedrock wells to the north-northeast of the site. Nottingham also states that USA Springs did not have an adequate monitoring network to evaluate the potential for drawdown on a northeast-southwest trending lineament. In fact, USA Springs had several monitoring wells located northeast and southwest of the site and therefore did assess this relationship. Nottingham also states that the effect of not adequately having enough well coverage to delineate the zone of influence is that a conservative wellhead protection area has not been delineated in accordance with Env-Ws 389.11. The Department finds Nottingham recommendations do not accurately consider and represent how the source water protection area was delineated by USA Springs. The source water protection area boundary was not established by only overlying the zone of influence, but also by considering watershed boundaries (see Figure 3-15 Updated – August 12, 2004 Submittal). Also, the source water protection area is designated as an area from which a well is likely to derive its water. Delineation of source water protection areas is required for new bottled water sources to determine if a well would likely be impacted by contamination sources. Even if this area was extended another 8000 feet to the north or south, no new existing or potential contamination sources would fall within the source water protection area based on the Department's existing records.

Second, during USA Springs' withdrawal test, five wells were monitored to the south-southwest of the site. There were no existing private bedrock wells within 8000 feet to the north of the USA Springs site, and USA Springs could not gain access to any of the undeveloped land north of the site to install bedrock monitoring wells. Also, a large portion of land north of USA Springs' property is a saturated wetland. USA Springs, instead, installed a deep bedrock monitoring well (OW-2) north/northeast of its pumping wells. This well was installed with the intent to determine if the USA Springs withdrawal would cause drawdown in northerly direction, thus it was sited in an area north of two of USA Springs' withdrawal sites determined to most likely be connected to the withdrawals at USA Springs as determined by a geophysical analysis. The five private bedrock wells monitored south of the USA Springs site exhibited

no response to pumping at the USA Springs site. OW-2, located between USA-1 and USA-2, exhibited a relatively minor response to pumping when compared to the drawdown in the pumping wells surrounding it 300 feet away (see Figure 3-13 of the August 12, 2003 submittal).

Nottingham also states that USA Springs has no basis for not extending the zone of influence to the northeast. Nottingham specifically states *"Yet what appears in the figure is a very unrealistic zone of influence. For example, at USA-1 there is 447 feet of drawdown, and less than 500 feet to the northeast, drawdown is represented in the figure as ending. There is no justification presented for why the zone of influence does not extend much farther to the northeast: the absence of wells does not mean that there are no hydraulic effects."* USA Springs acknowledged that the zone of influence in this direction is somewhat uncertain and has delineated this area with a dashed line, indicating that the delineation is estimated (see Figure 3-13, August 12, 2003 report). Bedrock monitoring well OW-2 is located approximately 300 feet away from USA Springs' pumping wells USA-1 and USA-2 and approximately north-northeast of two of USA Springs' pumping wells (USA-2 and 4). The estimated drawdown of the water level in OW-2 after 180 days of pumping with no net recharge is 108 feet, while the estimated drawdown in the three pumping wells is 247 to 447 feet. It should be noted that Nottingham has provided its comments utilizing Figure 3-13 from USA Springs' February 2003 report. USA Springs provided an update to this figure in its August 12, 2003 submittal that Nottingham did not consider.

Demonstration of Isotropic Conditions

Nottingham repeats its comment that the bedrock aquifer at the USA Springs site behaves in an isotropic manner by using pump test data obtained at the Just Cause Realty site. An isotropic condition means "the condition in which hydraulic properties of the aquifer are equal in all directions." Nottingham has created a histogram of aquifer transmissivity data that show the transmissivity of the bedrock aquifer has a consistent value from numerous monitoring points and therefore Nottingham argues that the bedrock aquifer is isotropic. As stated in Section 5.1, the Department does not concur that the data from field testing at the USA Springs or Just Cause Realty site demonstrate that isotropic conditions exist in the bedrock aquifer. First, the analysis provided by Nottingham uses select data from short-term small scale pump tests completed with four extraction wells as part of the remediation of the Just Cause Site, rather than the more reliable and comprehensive long-term, large scale pump test completed by USA Springs (Figure 3-13-Updated). In USA Springs' August 12, 2003 submittal, plots were presented that the predicted 180 day no net recharge to groundwater using data obtained from the ten day withdrawal test in which over 215 gallons per minute was pumped and water levels monitored in 70 wells scattered around the site installed at varying depths and directions. This figure clearly demonstrates the bedrock aquifer behaves in an anisotropic manner as monitoring points in all directions (except to the north where there was only one monitoring well monitored) from the site show a significant variance in response to pumping.

USA Springs also provided a map (Figure 3-9 of the February 2003 Final Report) that plotted the distribution of well yields and depth for bedrock wells at and around the site. This map shows that well yields at various depths are highly variable in close proximity to one another. This map also demonstrates wells yields do trend preferentially with orientation and location and that the aquifer does not behave in an isotropic manner.

5.3 Sustainability of the Proposed Withdrawal

Several comments and recommendations made to the Department state that USA Springs has not adequately estimated or assessed the nature and magnitude of recharge. Nottingham's consultant stated that the proposed withdrawal of 309,600 gallons per day is excessive, and unsustainable. He provided the following detailed comments on May 21, 2004:

It has already been demonstrated in Section 1 that the request to pump 309,600 gpd exceeds the ambient bedrock groundwater flow at the site (emphasis added) as well as the estimated bedrock recharge. However the pumping test itself also clearly demonstrates that even the 10 days of the USA pumping test were excessive withdrawals. Figures 2 through 11 display the plots of drawdown versus time for wells during the November 2002 pumping test of the USA Springs wells. What is quite remarkable is that for all of the bedrock wells (Figures 2 through 9), including the five days with no pumping (the recovery period), there was still a significant amount of residual bedrock drawdown: in the USA wells as well as abutter wells thousands of feet away! This demonstrates that significant dewatering occurred during the pumping test. In addition, this is proof that there is much less ambient flow below the site than is claimed by the applicant. If the recharge rate existed that is claimed by the applicant (Table 3-9 of the 3 February 2003 Gradient Report), then the system would have fully recovered well within the 5 days of recovery. This obviously did not happen. Just as troublesome is that well P-3D (a deep overburden well) also did not recover after the 5 day recovery period. This fact will be discussed in Section 5 (wetlands). This demonstrates that this application does not comply with Env-WS 389.11.b.1.

The 180 days of no recharge is a measure that exists in the statutes for determining a reasonable maximum drawdown. The history of this measure to be used in this way goes back to the predecessor rules to Env -Ws 388 and Env -WS 389. In establishing those rules, the NH DES technical advisory committee (of which this author was a member) initially (1988) focused on stratified drift aquifers. It was concurred by the committee that for the stratified drift aquifers, a 6-month period in which little to no recharge occurred would yield a reasonable low recharge period from which to make decisions about sustainable yield and well head area. In the present rules, the 180 day measure is now extended to bedrock formations. This may not be as reliable as in overburden formations. The reason for discussing this point is that the applicant (3 February 2003 Gradient Report) extends the pumping test data for all wells out to 180 days and uses these values as the expected maximum drawdown. This then presumes that the bedrock has secured some form of recharge such that drawdown does not continue past the 180 days. The applicant has failed to demonstrate that such recharge exists. The pumping test data clearly shows that no meaningful recharge was found during the 10 days of pumping. Figures 12 through 21 display derivative plots for wells during the November 2002 USA Springs pumping test. In these plots, the data points are the drawdown data supplied by the applicant, the dashed vertical lines are times when the pumping discharge was modified, the single full vertical line at 14,340 minutes is the end of the pumping test and the start of recovery, and the short solid vertical lines represent periods of precipitation (four occurrences of 0.10 inches during the pumping test, measured at the Durham, NH gage). A derivative plot basically plots the slope of the previous sets of plots (drawdown versus log time). The derivative plot is a very useful tool for characterizing the hydraulic characteristics of formations. If a formation behaves like a theoretical formation with no recharge (Theis curve), then the derivative plot reaches a plateau as time increases (this is when drawdown continues to increase with increasing time). If the formation has secured a source of recharge to meet the demand of a pumping well, well water levels stabilize (a

constant drawdown in the plot of draw down versus time), and the derivative plot returns to zero yielding a characteristic inverted U-shaped derivative plot. What is clear from Figures 12 through 21 is that during the ten day pumping test there was absolutely no evidence of significant recharge. This analysis of the pumping test data also demonstrates that the request to pump 309,600 gpd is unsustainable: even after ten days of pumping, no discernable bedrock recharge occurred. If significant bedrock recharge would have occurred during the pumping test, abutter observation wells would have stabilized and their derivative plots demonstrated the inverted U-shape. Well OW-2 only shows signs of recharge after changes in pumping and after precipitation events. The OW-2 data and particularly the pumping well data are much too noisy to make conclusions about bedrock recharge that would lead to a sustainable pumping rate for the USA wells.

As stated earlier in this section, the existing rules Env-Ws 388 and Env-Ws 389 expressly and impliedly require sustainability, i.e., that the water levels in the pumping wells stabilize. Env-WS 378.10(d)(3). If stabilization does not occur, the flow rate from the pumping test cannot be considered to be sustainable. The USA Springs pumping test is unsuitable to support the production volume of 309,600 gpd under the present Env-WS 378.10.d.3. All of the USA Springs production wells exhibited drawdowns much greater than the sustainability measure used by NH DES (USA-II. 7 ft/day, USA-24ft/day, and USA-4 0.3 ft/day). Also, the pumping test flow rate did not comply with Env- WS 378.1 0.d.1.

It is recommended that NH DES find that the applicant has failed to demonstrate that its proposed use is sustainable and so the applicant has not complied with Env- WS 389 or Env-WS 378 and therefore this application be denied.

Because USA Springs has not requested approval for a new bottled water source in accordance with Env-Ws 389, the Department makes no findings regarding Nottingham's recommendation pertaining to Env-Ws 389. Similarly, USA Springs is not seeking a new source of water for a small community water system. Therefore, the Department makes no findings pertaining to Env-Ws 378 as recommended by Nottingham. The Department finds that USA Springs complied with the criteria for issuing a large groundwater withdrawal permit in accordance with Env-Ws 388.23 as described in Section 3.0 and 4.0.

As stated in Section 5.1, above, Nottingham applied a method to estimate recharge that is not applicable to the geologic setting at the USA Springs property. Also, Nottingham has provided a technical recommendation that the withdrawal is not sustainable based on the ambient groundwater flow beneath the site. The Department provided findings regarding this recommendation in Section 5.1 that basically stated that applying the amount of groundwater flowing beneath the site under natural conditions as the sole basis for a large groundwater withdrawal decision: 1) Is not applicable on a scientific basis for determining sustainability, as the ambient groundwater flow beneath most withdrawal sites is less than what is pumped from a well; and 2) Is not a regulatory requirement. (i.e. the amount of ambient groundwater flow beneath the site is not a basis for determining permitted production volumes pursuant to Env-Ws 388 and RSA 485-C).

Water Level Recovery Data

In its May 21, 2004 comments, Nottingham states *"the pumping test itself also clearly demonstrates that even the 10 days of the USA pumping test were excessive withdrawals. Figures 2 through 11 display the plots of drawdown versus time for wells during the November 2002 pumping test of the USA Springs wells. What is quite remarkable is that for all of the bedrock wells (Figures 2 through 9), including the five days with no pumping (the recovery period), there was still a significant amount of residual bedrock drawdown: in the USA wells as well as abutter wells thousands of feet away! This demonstrates that significant dewatering occurred during the pumping test. In addition, this is proof that there is much less ambient flow below the site than is claimed by the applicant. If the recharge rate existed that is claimed by the applicant (Table 3-9 of the 3 February 2003 Gradient Report), then the system would have fully recovered well within the 5 days of recovery. This obviously did not happen. Just as troublesome is that well P-3D (a deep overburden well) also did not recover after the 5 day recovery"*.

As stated previously, the amount of "ambient groundwater flow beneath the site" is not a supportable scientific basis for determining the sustainability of the withdrawal and is not appropriate under the State's permitting requirements. Figures 2 through 11 provided by Nottingham do not summarize withdrawal test data for wells "thousands of feet away" as stated by Nottingham, rather it summarizes withdrawal test data for wells that are also close to the site as described below:

Well Referenced by Nottingham	Distance from USA Springs' Pumping Wells
USA-1	0 feet – This well is a USA Springs Pumping Well
USA-2	0 feet – This Well is a USA Springs Pumping Well
USA-4	0 feet – This well is a USA Springs Pumping Well
OW-2	300 feet
181 Old Turnpike Road	2500 feet
3 Lincoln Drive	2200 feet
19 Lincoln Drive	1500 feet
P-3D	50 feet
P-7D	500 feet

The requirements for the recovery period of the withdrawal testing program is specified by Env-Ws 379.11(e)(3)c (which is referenced by Env-Ws 388 as the withdrawal test design compliance criteria) and states *"the recovery period, during which the aquifer system recovers from the stress of pumping beginning immediately at shut-down of the pumping well and continuing until the water level in the pumping well or the nearest well within five feet of the pumping well has recovered 95%."* The USA Springs withdrawal test essentially complied with the criteria within only five days. USA-1 complied with the 95% recovery criteria within 4.5 days after the pumping portion of the withdrawal test was completed. The water level in USA-2 recovered 94.2% and essentially complied with the recovery criteria within 5 days of completing the pumping portion of the withdrawal test. The water level in USA-4 complied with the water level recovery criteria within 5 days of completing the pumping portion of the withdrawal test.

In theory, the time it takes for a water level to recover after pumping a well is stopped is the same amount of time it took to draw the water level down in the well. The pumping portion of USA Springs'

withdrawal test lasted for 10 days, and water levels in the bedrock aquifer of the pumping wells recovered to approximately 95% in half of that time. Water levels were monitored in approximately 70 monitoring points. Two-thirds of these monitoring points exhibited a response to pumping at USA Springs. Almost all of these observation points exhibited rapid recovery once pumping at the USA Springs site terminated. One-third of the monitoring points exhibited no response to pumping. Nottingham cites that the water level recovery data for P-3D is "troublesome" because its water level did not recover within 5 days after the pumping of the USA Springs' wells stopped. The Department does not agree with Nottingham's interpretation of data obtained from P-3D. First, there is no technical basis for stating that the water level should have recovered within 5 days. Again, in theory, recovery of water levels after pumping should take the same amount of time it took to draw water levels downward. Second, the water level in P-3D recovered rapidly after pumping and continued to show strong recovery until water level monitoring ceased (see Figure 1). Third, Nottingham selectively analyzed the data USA Springs provided in its submittals. Data submitted by USA Springs clearly showed that water levels in overburden observation points such as P-3D rose rapidly immediately prior to USA Springs' withdrawal test due to above average precipitation (see Figures 1 and 2 below). Precipitation during the withdrawal test was significantly less than that which occurred prior to withdrawal testing. This means that the baseline water level conditions in which drawdown during the withdrawal test was measured were higher than normal. There is no reason to believe that water levels in the overburden aquifer would recover back to these high conditions after pumping USA Springs' wells unless similar above average precipitation continued to occur. It is important to note in Figure 1 that the water levels in P-3D did recover above the ambient water level measurements made just one week prior to the pumping test.

180-day No Net Recharge Condition

Nottingham states the following:

The 180 days of no recharge is a measure that exists in the statutes for determining a reasonable maximum drawdown. The history of this measure to be used in this way goes back to the predecessor rules to Env -WS 388 and Env -WS 389. In establishing those rules, the NH DES technical advisory committee (of which this author was a member) initially (1988) focused on stratified drift aquifers. It was concurred by the committee that for the stratified drift aquifers, a 6-month period in which little to no recharge occurred would yield a reasonable low recharge period from which to make decisions about sustainable yield and well head area. In the present rules, the 180 day measure is now extended to bedrock formations. This may not be as reliable as in overburden formations. The reason for discussing this point is that the applicant (3 February 2003 Gradient Report) extends the pumping test data for all wells out to 180 days and uses these values as the expected maximum drawdown. This then presumes that the bedrock has secured some form of recharge such that drawdown does not continue past the 180 days. The applicant has failed to demonstrate that such recharge exists.

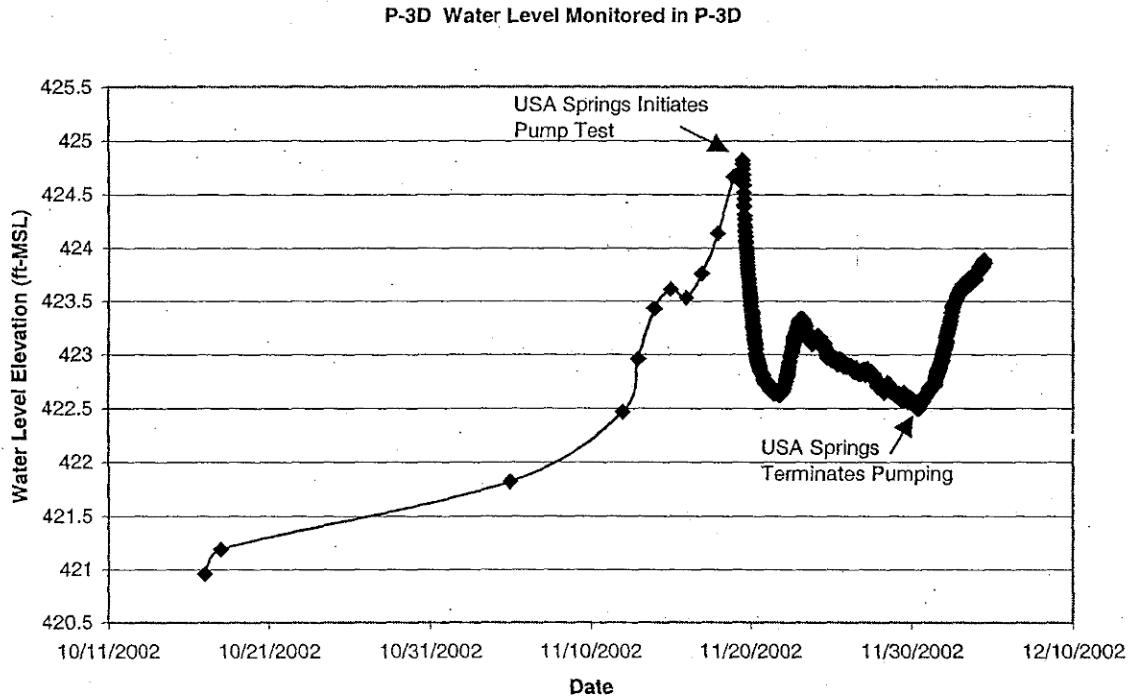


Figure 1: Water Level Elevation in P-3D

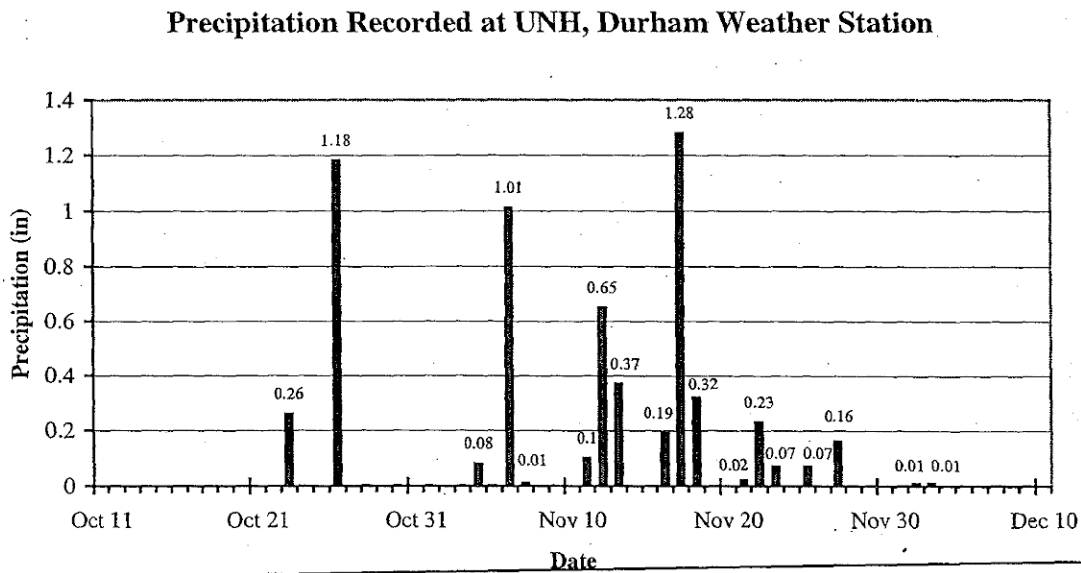


Figure 2: Precipitation Recorded Prior to, During, and After the Withdrawal Test

The large groundwater withdrawal rules (Env-Ws 388.06(h) and 388.14) and not the statute as stated by Nottingham requires that an applicant develop a hydrologic conceptual model under the conditions without groundwater recharge from rainfall or snowmelt. The requirements of Env-Ws 388 simply were not carried over from other rules as stated by Nottingham. This is obvious by comparing Env-Ws 388 with any other set of groundwater rules that existed prior to the adoption of Env-Ws 388.

To date, the Department has issued seven large groundwater withdrawal permits, and three of those permits are for sites with bedrock wells. The 180-day no net recharge criteria required by the rules has been sufficient in assessing and mitigating potential impacts to date.

Use of Derivative Plots

Nottingham has submitted derivative plots and interpreted these plots to mean that the pumping of USA Springs' wells is dewatering the aquifer and that there is no apparent recharge to the aquifer. Derivative plots are basically a method that looks at the change in the rate of drawdown with time instead of just the traditional time vs. drawdown plots. The practical benefit is that it magnifies certain processes that may be difficult to see in a simple time-drawdown plot. One of the problems with derivative analysis is that you have to have very clean, accurate, noise-free data because small blips in drawdown measurement can cause a huge effect on the derivative and be open to all sorts of spurious interpretations. This is especially true for measurements made in pumping wells which are greatly affected by borehole storage, skin effects and small variations in the pumping rates. In fact, one of the most practical uses of derivative analyses is to identify the extent to which withdrawal test results are affected by borehole storage and skin effects. Env-Ws 388 does not specify that derivative plots be developed, and the application of derivative plots for aquifer pumping testing is not standard industry practice. Only a few research papers and a book published in the 1990s demonstrate that derivative plots may be useful for: 1) Determining aquifer formation response characteristic; 2) Determining the appropriate analytical technique to analyze aquifer test data; 3) Determining when infinite acting radial flow conditions are established; 4) Determining the flow efficiency and skin effects of a well.

The Department finds that the 1) Applicability of derivative plots; 2) Method of interpreting these plots; 3) Conclusions provided by Nottingham relative to the derivative plots are flawed and/or unsubstantiated; and 4) Env-Ws 388 does not require the development of derivative plots. The Department also researched, but could not find any published references for the specific mathematical solution Nottingham applied to develop the derivative plots.

Derivative plots should only be derived from very "clean" data sets. As mentioned before, noisy drawdown curve can cause the derivative plot to go all over the place and open to all sorts of spurious interpretations. This is apparently what occurred with Nottingham's interpretation of these plots. Nottingham developed derivative plots for water levels for the following ten wells:

Locations of Where Water Levels Were Obtained to Develop Derivative Plots

Description of Well

USA-1	This is a USA Springs Pumping Well
USA-2	This is a USA Springs Pumping Well
USA-4	This is a USA Springs Pumping Well
OW-2	Monitoring Well at USA Springs Site

3 Lincoln Drive	Active Residential Pumping Well
19 Lincoln Drive	Active Residential Pumping Well
165 Old Turnpike Road	Active Residential Pumping Well
181 Old Turnpike Road	Active Residential Pumping Well
Monitoring Well P-3D	Monitoring Well at USA Springs' Site
Monitoring Well P-7D	Monitoring Well at USA Springs' Site

First, Nottingham did not provide a reference for the mathematical solution it used to develop the derivative plot. The Department obtained spreadsheets from Nottingham's consultant that show the use of a mathematical solution for the derivative plots that the Department cannot find to be published. The Department reviewed several references (F. A. Spane, Vol 31, No. 5 Groundwater, 1993 – "DERIV: A Computer Program for Calculating Pressure Derivatives for Use in Hydraulic Test Analysis; R. Horne, "Modern Well Test Analysis, 1995, Petroway, Inc.; and G. A. Tonder and others, "Estimation of the Sustainable Yield of a Borehole Including Boundary Information, Drawdown Derivatives and Uncertainty Propagation, October 1998). The Department found that all of these publications provide a different algorithm than that of which Nottingham developed. All of the references mentioned above provide "characteristic" or "type curves" for derivative plots that are used to determine and categorize derivative plots from pumping tests as exhibiting in no flow boundary or constant head boundary conditions. However, different kinds of type curves derived using different algorithms can have very similar shapes. This means that Nottingham cannot simply develop derivative plots using its own algorithms and then apply these to characteristic plots developed for derivative plots using a different algorithm. Furthermore, Nottingham made no effort to research and apply derivative plots for the crystalline bedrock aquifer that is the source of water of USA Springs' wells. Crystalline bedrock has secondary porosity features that are not accounted for in sedimentary rock or porous media which has been typically assessed in the limited research and application of derivative plots used in the industry.

Second, all but three of the wells listed above were either USA Springs' pumping wells or private residential wells that pumped intermittently during the withdrawal test. The residential pumping wells are pumped whenever the residents of the home use water. Monitoring the water level in these wells is necessary and required by Env-Ws 388. Even though the water level in the residential well fluctuates dramatically as it is intermittently pumped, one can easily see how USA Springs' withdrawals impact the baseline water level in the well (see Figures 3 and 4 later in this section). What is also apparent from Figures 3 and 4, however, is that the datasets are very noisy from these wells to the extent that graphing the slope (taking the derivative) of the drawdown changes versus time graphs prepared by USA Springs does not show how sustainable the proposed withdrawal is, but rather it shows slope of the change in water level caused by intermittent residential well pumping versus time. This means Nottingham has plotted the derivative (change in slope of intermittent drawdown and recovery) caused by residential well pumping. This information has no utility and is not how derivative plots have been applied in published literature on the topic. The small to large sporadic changes in water level elevations measured in private wells caused by intermittent pumping of these wells have resulted in huge "blips" in the graphed data that make the results of derivative plots uncertain and not an appropriate basis for a regulatory decision by the Department.

Nottingham also provided derivative plots for three pumping wells at USA Springs. Although research has shown that derivative plots can be appropriately developed for pumping wells in certain types of aquifer formations, the drawdown assessed in these data sets are very noisy because they are impacted by multiple factors including skin effects (drawdown caused in a pumping well due to frictional losses and turbulent flow), water storage in the borehole, and small variations in the pumping rate. As mentioned

above, one of the most practical uses of derivative analyses is to identify the extent to which pump test results are affected by borehole storage and skin effects. But when skin effects and borehole storage is an issue, derivative drawdown plots for pumping wells are not meaningful for assessing long-term sustainability as stated by Nottingham.

Nottingham developed derivative plots for three on-site monitoring wells (P-3D, P-7D, and OW-2). The derivative plots produce a distribution of data that is completely scattered and exhibits no trend that can be interpreted for meaningful conclusions.

Third, Nottingham states that none of the derivative plots it developed support the conclusion that USA Springs pumps from is or will be recharged. The Department finds that Nottingham has not provided technical justification or references for the algorithms and associated characteristic curves it applied to complete the analysis.

5.4 Abutter Wells

Several recommendations made to the Department state that private wells surrounding the USA Springs site will be adversely impacted by the withdrawal at USA Springs. Nottingham's consultant stated that USA Springs will cause adverse impacts to other water users with private wells and provided the following detailed comments on behalf of Nottingham on May 21, 2004:

Both the applicants' reports and prior testimony by this author have determined that abutter wells will exhibit dramatic lowering of their water levels in response to a large withdrawal by USA Springs. Figures 22 and 23 are reproduced from Appendix H of the 3 February 2003 Gradient Report and show the trace of ground water levels in one of the abutter wells. In Figure 22, prior to the pumping test, the maximum recorded drawdown experienced in this well was 26 feet. These water levels were recorded with a pressure transducer for one month prior to the start of the pumping test. During the pumping test, the water level in this well fell by almost 40 feet. More dramatically, the maximum drawdowns in this well (on top of the almost 40 feet caused by the USA Springs pumping) during and after the pumping test were 39 to 45 feet! Not only does the large groundwater withdrawal lower abutter water levels, but these wells may not be capable of supplying their typical yields if 309,600 gpd is permitted because more drawdown is required to meet domestic demands. This demonstrates that the USA Springs pumping reduced the bedrock yield to these wells, and as a result, the wells manifest more drawdown (water for domestic use now comes from the well bore, when needed, rather than from flow in the formation). This dramatic magnification of drawdown in abutter wells due to just the domestic demands was clearly evident during the 10-day pumping test (plus the 5-day recovery period). It strongly suggests adverse effects in abutter wells, and this effect will be only more pronounced if such a large withdrawal continues for much more extended periods of time because the longer duration of USA Springs pumping will regionally lower water levels thereby making the bedrock flow to individual wells even more limited. This is not an issue that simple monitoring will ameliorate. Lowering the pump intake in these wells (as suggested in the 3 February 2003 Gradient Report) may not be possible, and may actually be more harmful to the pump (potential to draw in sediments from the bottom of the well).

It has also been suggested by the applicant that in the case of abutter wells being adversely affected by the large groundwater withdrawal, that their wells can be deepened. Drilling deeper is not a panacea and

can actually result in more problems. It is not a panacea because there is no guarantee that more water will be found. It may cause further problems because the water quality may decrease dramatically, possibly making the water altogether unpotable. The recent deepening of a bedrock well in Hollis, NH (from 600 ft to 800 ft) resulted in very high methane levels and the contamination of another nearby bedrock well by the methane. Deepening a well in Madbury, NH led to dramatically higher iron and pH. This is not a fair and equitable resolution to abutters adversely impacted by reduced water supply in their wells due to overpumping at a large ground water withdrawal.

It is recommended that NH DES find that the applicant has not demonstrated that the significant drawdown in abutters' wells caused by its pumping does not constitute an adverse effect and therefore on this ground this application be denied.

The Department finds that Nottingham's comments are not based either on the requirements of Env-Ws 388 or submittals USA Springs provided in August and September 2003. The Department's final decision explaining both the large groundwater withdrawal permitting requirements and how the permit issued for USA Springs complies with the requirements of Env-Ws 388 is described in detail in Sections 3.0 and 4.0, above. More detailed responses are provided below.

Abutter Well Comment 1: Both the applicants' reports and prior testimony by this author have determined that abutter wells will exhibit dramatic lowering of their water levels in response to a large withdrawal by USA Springs.

USA Springs monitored 30 residential wells during the withdrawal testing program. The water level in thirteen of the wells monitored exhibited no response to pumping. The water level in the seventeen remaining monitoring wells exhibited a response to pumping that when projected out to 180 days under the condition of no recharge to the groundwater will dewater the water column in wells from 6% to 24% (average 5.5%, median 5.7%). USA Springs, evaluated in Table 4-1 of its August 12, 2003 submittal, the amount of water dewatered in the water column of each well and found that the lowest water column found in any private well it monitored when pumping for 180 days with no recharge to groundwater would be approximately 133 feet. This provides sufficient storage in the borehole of the "worst case" well.

Abutter Well Comment 2: Figures 22 and 23 are reproduced from Appendix H of the 3 February 2003 Gradient Report and show the trace of ground water levels in one of the abutter wells. In Figure 22, prior to the pumping test, the maximum recorded drawdown experienced in this well was 26 feet. These water levels were recorded with a pressure transducer for one month prior to the start of the pumping test. During the pumping test, the water level in this well fell by almost 40 feet. More dramatically, the maximum drawdowns in this well (on top of the almost 40 feet caused by the USA Springs pumping) during and after the pumping test were 39 to 45 feet! Not only does the large groundwater withdrawal lower abutter water levels, but these wells may not be capable of supplying their typical yields if 309,600 gpd is permitted because more drawdown is required to meet domestic demands. This demonstrates that the USA Springs pumping reduced the bedrock yield to these wells, and as a result, the wells manifest more drawdown (water for domestic use now comes from the well bore, when needed, rather than from flow in the formation). This dramatic magnification of drawdown in abutter wells due to just the domestic demands was clearly evident during the 10-day pumping test (plus the 5-day recovery period). It strongly suggests adverse effects in abutter wells, and this effect will be only more pronounced if such a large withdrawal continues for much more extended periods of time because the longer duration of USA

Springs pumping will regionally lower water levels thereby making the bedrock flow to individual wells even more limited.

Nottingham references its Figure 22 and 23 as evidence that USA Springs' pumping wells cause "dramatic dewatering". Figure 22 and 23 provided by Nottingham present water level data in a graphical format for one well, the private well located at 165 Old Turnpike Road. The Department finds that this well appears to be a very viable water supply source as long as the pump in the well is low enough and an adequate horse power to pump water to the residence when the head of the water table is reduced by approximately 60 feet. The Department has provided graphs in Figures 3 and 4, below, plotting the drawdown versus time, and anticipated drawdown after pumping for 180 days with no net recharge. The graphs of water levels in private wells provided in Figures 3 and 4 below, were obtained by placing pressure transducers with data loggers in the private wells. These devices were programmed to record water levels in the private wells every fifteen minutes during the USA Springs withdrawal test, and once every hour during the water level monitoring that occurred prior to the withdrawal test. The graphs show the measured water level data with time. The graphed water level data show the general water level trend, with some rapid spikes downward in water levels that occur over very short periods of time. These spikes occur when the private well owner utilizes water and the well is monitored to assess the effects of USA Springs' withdrawal. Nottingham has stated (using the well at 165 Old Turnpike Road as the extreme example) that the spikes in the water trends are more significant when USA Springs is pumping than without pumping and extrapolates this to mean that private wells surrounding the site will not yield a sufficient amount of water when USA Springs' wells are pumping. The Department finds that data obtained for this well indicates that the well itself will be a viable water supply source when USA Springs' wells are pumping.

The Department agrees with Nottingham's assessment that the spikes in the water levels drop more when private wells are pumping simultaneously with USA Springs' wells. These spikes on average approximately double in depth (from about 10 to 20 feet) when USA Springs' wells were pumping. The Department does not interpret this relationship to mean widespread dewatering of the aquifer and associated private wells will occur. These increases: 1) Are to be expected in any instance where a pumping well alters the potentiometric surface of an aquifer (all pumping wells impact the potentiometric surface of a water table); and 2) Do not impact the viability of a well as long as the depth of the well, depth of the pump setting and pump horse power is adequate to accommodate the change in the head of the water table. As described in Section 4.1.2, USA Springs will be required to mitigate any well potentially or actually adversely impacted by the withdrawal as allowed by Env-Ws 388, including reducing its withdrawal rates, installing new pumps, lowering the depth of the pumps or constructing a deeper water supply well. The Department has data from other projects whereby the water level in a large municipal or golf course pumping well has reduced the water level in a private well by over forty feet, yet these wells continue to provide an adequate water supply to residential homes. State law and the large groundwater withdrawal permitting requirements (Env-Ws 388.18) protects private wells based upon minimum yield requirements (up to 10 gallon per minute for private residential wells) and not a threshold for drawdown in a private well.

Abutter Well Comment 3: This is not an issue that simple monitoring will ameliorate. Lowering the pump intake in these wells (as suggested in the 3 February 2003 Gradient Report) may not be possible, and may actually be more harmful to the pump (potential to draw in sediments from the bottom of the well).

The Department agrees with Nottingham's comment that the potential dewatering of private wells cannot be ameliorated by monitoring. It is for this reason that Env-Ws 388.21 and 388.22 requires mitigation

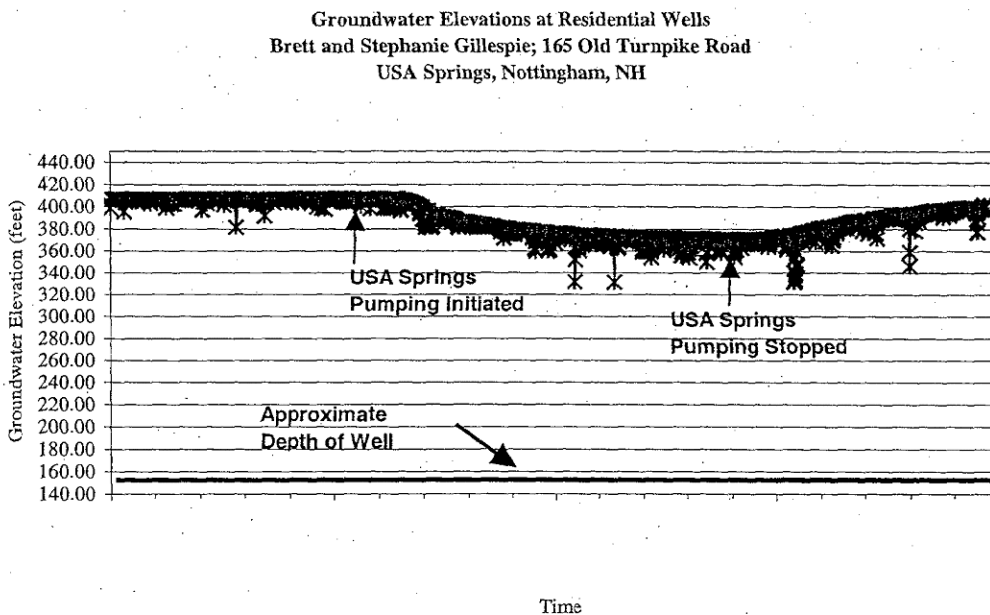


Figure 3: Arithmetic Plot of Drawdown Versus time at 165 Old Turnpike Road

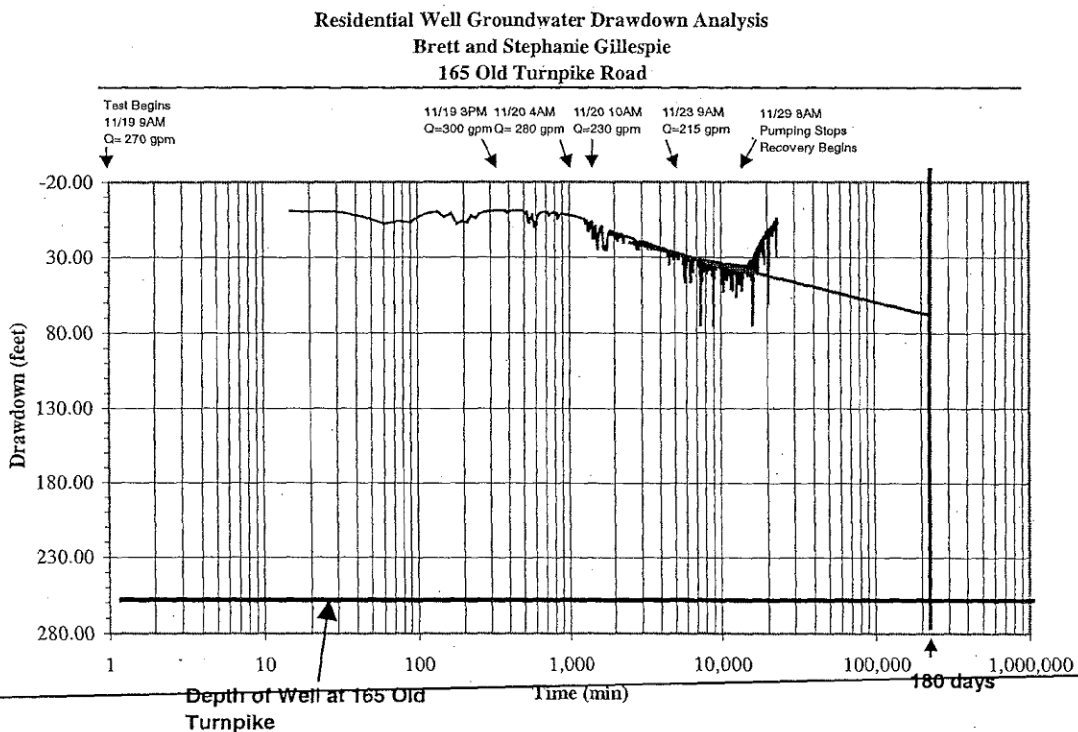


Figure 4: Semi-logarithmic Plot of Drawdown Versus time at 165 Old Turnpike Road

plans to mitigate adverse impacts as defined by Env-Ws 388.18 to private wells, and that USA Springs proposed a monitoring, reporting and mitigation plan in both its August 12, 2003 and September 11, 2003 submittals. The Department incorporated and amended the proposed monitoring, reporting, and mitigation program into the large groundwater withdrawal permit issued for USA Springs, and ensured that this withdrawal is permitted in accordance with the requirements of Env-Ws 388.

The lowering of a pump in a well may or may not be possible based upon the depth of the well and depth of the pump. Sedimentation is a common problem, and if a mitigated well may experience sedimentation due to the lowering of the pump, a permittee would be required to install pumps and filtration equipment that can withstand and remove the sediment; or the permittee would be required to drill a new deeper well whereby the pump setting would be well above the bottom of the borehole. All of this work is routine even in developing wells where no large withdrawal is nearby. Work of this nature would be completed by licensed professionals contracted by the permittee as required by the Department in accordance with the requirements of Env-Ws 388 and the conditions of the permit at no initial capital cost to the private well owner.

Abutter Well Comment 4: It has also been suggested by the applicant that in the case of abutter wells being adversely affected by the large groundwater withdrawal, that their wells can be deepened. Drilling deeper is not a panacea and can actually result in more problems. It is not a panacea because there is no guarantee that more water will be found. It may cause further problems because the water quality may decrease dramatically, possibly making the water altogether unpotable. The recent deepening of a bedrock well in Hollis, NH (from 600 ft to 800 ft) resulted in very high methane levels and the contamination of another nearby bedrock well by the methane. Deepening a well in Madbury, NH led to dramatically higher iron and pH. This is not a fair and equitable resolution to abutters adversely impacted by reduced water supply in their wells due to over pumping at a large ground water withdrawal.

The Department finds that Nottingham's comment does not provide a basis to deny the large groundwater withdrawal permit for the following reasons: First, available data does not indicate any well would have to be deepened. Second, if a well were to require deepening, it is likely that it would be a shallow bedrock well and that deepening or siting a new water source on the property would almost certainly both be options. Third, the large groundwater withdrawal permit conditions require that aquifer water levels be maintained at prescribed levels that will most likely not require well deepening. Finally, in addition to deepening a well to increase water yield, the permittee may reduce the volume of the withdrawal in accordance with Env-Ws 388.21(c) to mitigate adverse impacts.

Over the last few years, thousands of new well completion reports have been submitted to the Department. Many of these reports involved deepening existing water wells or developing new sources at locations where existing wells were impacted by drought. The Water Well Board is also a central point of contact for the public or well drillers to report problems with new water sources. The occurrence of methane has never been reported to the Water Well Board or the New Hampshire Geological Survey as a problem that has been encountered when deepening a well except for one well site in Hollis. Similarly, all of the community water supply wells permitted by the Department (the majority of which are bedrock wells), the contamination of the well with naturally occurring methane has never been a problem. The well in Hollis that was impacted by methane can not be used by the Department as a basis to deny USA Springs' large withdrawal permit application.

If deepening the well or providing an alternative water supply required for mitigation produces water with a quality that does not comply with Federal or State drinking water standards due to naturally occurring contamination, then USA Springs will be required to pay for the installation of water treatment equipment and associated costs in accordance with Env-Ws 388.22 and permit Condition 6(c). Both high iron and pH are common water quality problems for water derived from bedrock aquifers in New Hampshire, and there are many treatment processes that can be used to provide drinking water that complies with applicable state and Federal Standards.

5.5 Wetlands

Nottingham has stated the concern that wetlands in the region will be adversely impacted by the withdrawal at USA Springs. Nottingham's consultant stated that USA Springs will cause adverse impacts to wetlands and provided the following comments on May 21, 2004:

Very often in New Hampshire, wetlands are groundwater discharge locations, especially those that sit in topographically lower areas. Figures 24 through 27 depict the time histories of groundwater levels in overburden well couplets (a pair of wells) situated proximal to wetlands. These were drilled wells with the deeper of the two wells (designated with the letter 'D') possessing a screen close to bedrock and the shallower ('S') wells with screens closer to the ground surface. Groundwater moves from elevations of higher water elevation to lower water elevation. Therefore the overburden well couplets (deep and shallow at almost the same location) give information about groundwater flow in the vertical direction. For well couplets P-1S/P-1D and P-6S/P-6D, before, during, and after the pumping test, groundwater moved downwards. This is very reasonable given how wet it was during this time period and given the time of year. Well couplet P-2S/P-2D exhibited nearly static (in the vertical) groundwater, with a slight downward flow prior to the pumping test. Well couplet P-7S/P-7D reflected upwards flow prior to the pumping test. At the start of the pumping test, there was a near immediate reaction in all of the deep overburden wells, as well as shallow wells P-1S and P-7S. Well P-1S had such a dramatic decline that its water level was nearly the same as for P-1D during the pumping test. This may indicate a strong vertical connection in the overburden at this location. In all other couplets, there was a dramatic increase in the difference of water elevations between the deep and shallow wells. The most troubling is couplet P-7S/P-7D: this couplet demonstrated groundwater discharge, yet the pumping test dramatically reversed the gradient. Couplet P-7S/P-7D is very close to the Barrington prime wetlands. Although most of the well records show a downward gradient during this pumping test, this may not be true year-round. It is very likely that bedrock groundwater discharges to most of these wetlands for a good duration of the year. Therefore a large groundwater withdrawal can likely lead to much drier wetland conditions. The applicant has not expended the effort to understand the annual variability in vertical groundwater fluxes, especially as they relate to sustaining the wetlands. The near instantaneous and dramatic lowering of overburden well water levels in just this brief ten days of pumping, during a wet period, is cause for concern when weighing the prolonged pumping of 309,600 gpd. Given the fact that the local Towns have gone to great efforts to identify and protect wetlands, stewardship of natural resources must recognize that adverse effects from large groundwater withdrawals are implied by the data collected to date: permitting the withdrawal and only monitoring these effects is analogous to allowing them to occur. A much more prudent posture regarding wetlands is to only permit a flow that does not reverse groundwater vertical gradients.

By minimally addressing the relationship between bedrock groundwater and wetlands the application does not comply with Env-Ws 388.06.m and Env-Ws 389.07. It is recommended that NH DES find that the applicant has not demonstrated that significant drawdown which will occur at prime wetlands does not constitute an adverse effect and therefore on this ground this application be denied.

The Department finds the comprehensive monitoring, reporting, and mitigation program required by the permit and described in detail in USA Springs' submittals on August 12, 2003 and September 11, 2003 is sufficient to ensure compliance with Env-Ws 388. Regulatory requirements were summarized in Section 3.0, above. The Department can deny a large groundwater withdrawal permit report that contains the information required by Env-Ws 388 only when the permittee does not demonstrate that a proposed withdrawal when coupled with a monitoring, reporting, and mitigation plan may cause adverse impacts that occur immediately and that are irreversible. The Department finds that the withdrawals at USA Springs will not cause impacts to wetlands that are immediate and irreversible. A letter from David VanLuvan of the Natural Heritage Inventory of the Department of Resources and Economic Development states that there are no recorded occurrences for sensitive species near the project area. Therefore, the Department finds that there is no basis for determining that an irreversible adverse impact to endangered or sensitive species will occur.

On August 12, 2003, the Department denied a large groundwater withdrawal permit to USA Springs based on its February 2003 Final Report for several reasons. One reason pertained to wetlands. The Department provided the following comment in its letter dated August 12, 2003:

"16) Effects of Precipitation Data on Data Obtained from the Withdrawal Test on the Wetland Impact Assessment: As described in Finding 6 above, rain, snow, temperature fluctuations, and discharge pipe leakage may have an effect on water levels during the withdrawal test. Measurements obtained from monitoring points located in the shallow overburden and surface water bodies also appear to be impacted by weather trends (see water level elevations measured during the antecedent and pumping periods for OW-1, DP-1S, PS-2S, PS-3S, PS-4S, PS-8S, PS-9S, P-1S, P-1D, P-2S, P-2D, P-3S, P-4S, P-4D, P-5S, P-5D, P-6S, P-6D, P-8S, P-8D, P-9S, and P-9D).

Env-Ws 388.20(a)(1) describes the need to conduct ongoing monitoring upon operating a withdrawal when withdrawal testing data are not sufficient to verify that adverse impacts from a large withdrawal will not occur (emphasis added). Although the withdrawal test included a substantial number of monitoring points, many of the responses observed from shallow overburden and surface water monitoring locations were dominated by very high precipitation and highly variable climatic conditions. These influences caused the water level in the shallow monitoring wells to rise an order of magnitude higher than the typical range of drawdown that is caused by a ten day withdrawal test. This means that even if corrections for precipitation are applied, that much of the environmental monitoring data collected during the withdrawal testing program will be ambiguous.

The application does not contain a monitoring, reporting, and mitigation program prepared in accordance with Env-Ws 388.20 and 388.21 to compensate for insufficient and incomplete data that exists to complete an adverse impact assessment in accordance with Env-Ws 388.20 as allowed by Env-Ws 388.20(a)(1). The monitoring, reporting, and mitigation program presented in Section 4.2.3 of the report is very limited in scope, and only monitors the prime wetland immediately adjacent to the site. A comprehensive monitoring, reporting, and mitigation plan must be developed and implemented that protects the functions and values for all wetlands within a zone of influence that is delineated in accordance with Env-Ws 388.09(a), Env-Ws 388.06(h) or Env-Ws 379.11(e)(8) in order

to ensure that adverse impacts as defined by Env-Ws 388.18(c)(6) and (7) do not occur. (emphasis added).

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2)."

After the Department issued its decision on August 12, 2003, USA Springs provided supplemental information on August 12, 2003 and September 11, 2003 that satisfies the monitoring, reporting, and mitigation program requirements of Env-Ws 388.20 and 388.21. The proposed monitoring, reporting, and mitigation program compensates for insufficient and incomplete data as allowed by Env-Ws 388.20(a)(1). These submittals also contained additional soil profiles. The Department does not find that USA Springs "minimally" addressed its obligation to assess impacts to wetlands, as Nottingham describes, but rather that USA Springs made a reasonable effort to assess impacts using both water level and water quality indicators.

Nottingham states that "Well P-1S had such a dramatic decline that its water level was nearly the same as for P-1D during the pumping test. This may indicate a strong vertical connection in the overburden at this location." Nottingham presents a graph in its Figure 24 that uses data from some other source, because the data obtained by USA Springs and submitted to the Department in both the February 2003 Final Report and updated on August 12, 2003 clearly shows that P-1S and P-1D showed no response to pumping. Therefore the Department disagrees with Nottingham's statement about how water levels were "dramatically" impacted in P-1S and P-1D. The figure from the August 12, 2003 report is attached below as Figures 5 and 6. These figures show the actual relationship between P-1S and P-1D during the withdrawal test at USA Springs. It is clear from these figures that the water level at this monitoring point rose during the withdrawal test.

Nottingham cites its concern about the observed decline in the deep couplet P-7. The Department agrees with this concern and denied the large groundwater withdrawal permit on August 12, 2003 because USA Springs' application did not demonstrate that the withdrawal would not cause irreversible adverse impacts. Since August 2003, USA Springs has submitted supplemental information that demonstrates using a comprehensive monitoring, reporting, and mitigation program so that adverse impacts will be prevented. USA Springs monitored water levels and changes in water quality in approximately 23 monitoring points. USA Springs predicted that if no recharge to groundwater occurred for 180 days that a drawdown in approximately 50% of the monitoring points could be expected, and that a response in the water level for the other 50% of the monitoring wells is not anticipated. USA Springs' impact analysis is conservative because it assumed no direct precipitation to wetlands or run-off.

Nottingham recommends that a "much more prudent posture regarding wetlands is to only permit a flow that does not reverse groundwater vertical gradients." This recommendation is not practical and is inconsistent with standard industry practice. Almost every large groundwater withdrawal in the northeastern United States would fail this test at some point in an average year. In fact, many wells are sited near rivers (all which have riparian wetlands) with the sole objective of inducing river recharge to pump water for drinking water supply, business, or recreation.

In a letter dated May 24, 2004, the Town of Barrington also offered additional comments and recommendations regarding impacts USA Springs proposed withdrawal may cause. Included within

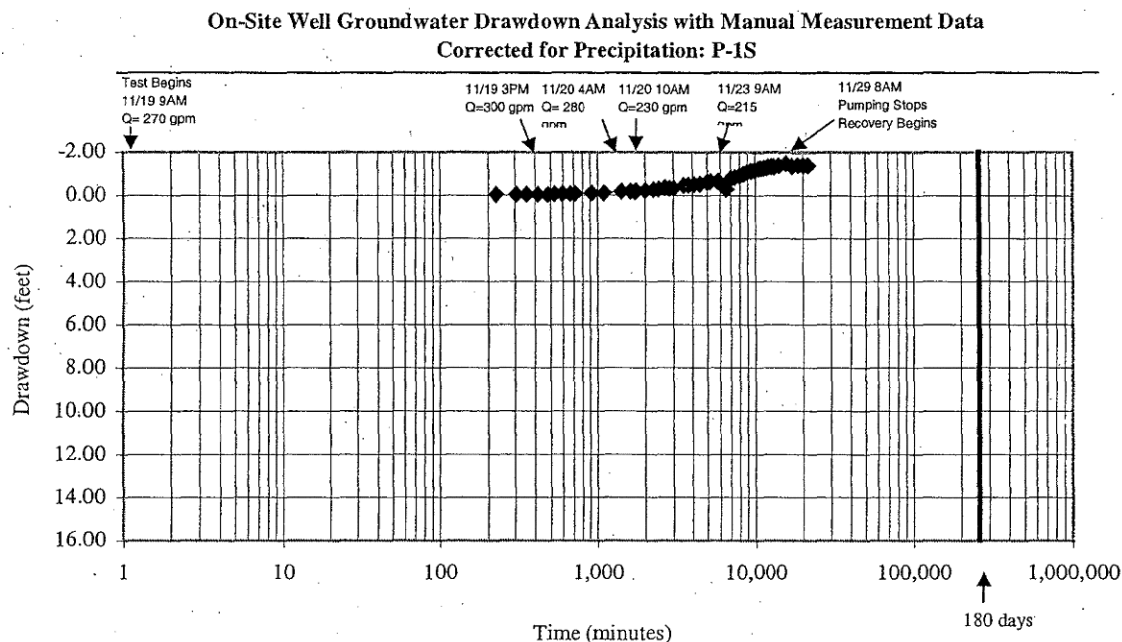


Figure 5: Water Level Drawdown Measurements in P-1S During the USA Springs Withdrawal Test

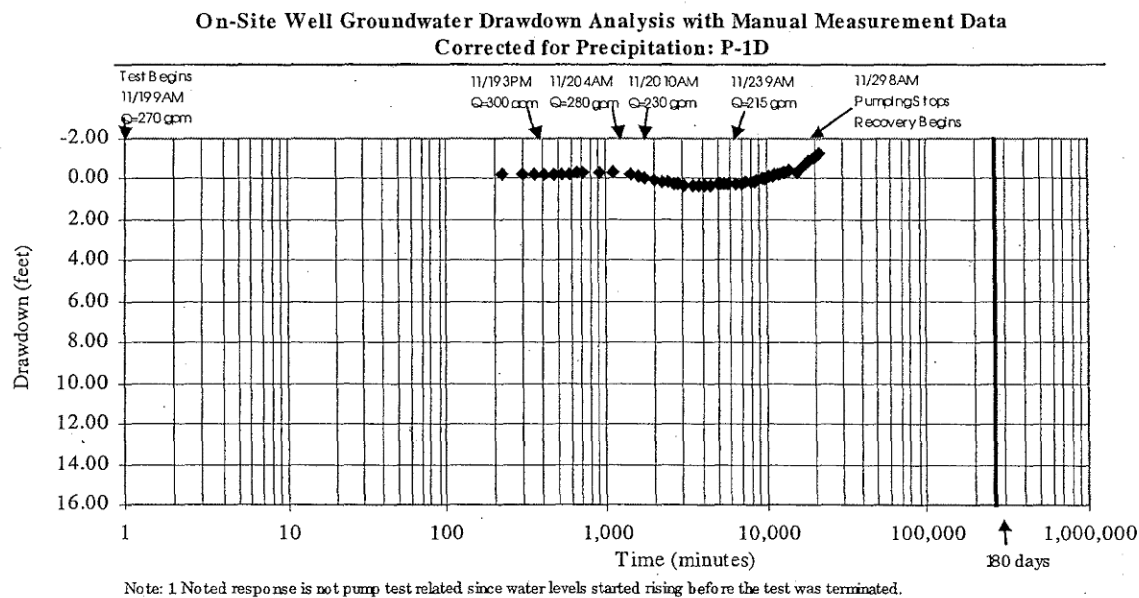


Figure 6: Water Level Drawdown Measurements in P-1D During the USA Springs Withdrawal Test

these comments were several specific recommendations and comments. The Department has provided excerpts of these concerns below and has provided findings:

In its Withdrawal Report, USA Springs documents numerous impacts to water resources, including wetlands. For example, under the conceptual hydrologic model withdrawal conditions, as required by Env-Ws 388.09, USA Springs reports that the water level of BPW-40 will be drawn down anywhere from six inches to two feet. (Withdrawal Report p. 36.) In the Withdrawal Report, groundwater quality data confirms that groundwater elevations will be lowered within BPW -40. (Withdrawal Report p. 36.)

In addition, the Withdrawal Report states that the groundwater discharge rate to BPW -40 will be lowered. (Withdrawal Report p. 38-39.)

In its April 11, 2003 "Preliminary Technical Comments" and its August 12, 2003 Decision, DES states that "two feet of drawdown in the shallow overburden may be significant. The lowering of shallow water by two feet may dewater submerged wetlands or lower the water table below the root zone of wetland vegetation, thus adversely impacting natural resources and causing adverse impacts to occur as described by Env-Ws 388.18(c)(6) and (7)." (April Comments p. 6 and August Decision p.11.) In the August Decision, the DES further states that "the application does not assess if two feet of draw down may impact the functions and values of wetlands as required by Env-Ws 388.16 using the criteria for impact to water resources specified in Env-Ws 388.18(c)(6) and (7)... ." (August Decision p.11.)

In its response to the April 11, 2003 DES Preliminary Technical Comments, USA Springs does not explain why it does not assess the impact of two feet of drawdown and simply takes a pass and says that "the degree of response on wetland vegetation, if any, due to lowering of groundwater head depends on numerous factors, such as soil type, plant type, etc." (USA Springs Response to Preliminary Technical Comments p.8.) The refusal by USA Springs to assess the impact that the withdrawal will have on the functions and values of wetlands as required by Env- W s 388 and Env- W s 389 is an event of non-compliance that cannot be cured by a monitoring program; indeed, DES in its August Decision cites this non-compliance as an independent ground for denial.

The Department finds that Barrington provided a only a partial summary of the Department's comments and findings to USA Springs in April and August of 2003. In its April 2003 letter, in addition to the comment Barrington provides, the Department provided the following comment:

"7.0 Future Monitoring, Reporting and Mitigation Requirements

On page 41 of the report, it is explained that the objective of the proposed future monitoring and reporting program is to: "1) Confirm the conclusions reached on the basis of the withdrawal test; 2) Ensure that the operation of the proposed withdrawal does not have any adverse impacts on current water users or wetlands; and 3) Collect data needed to make necessary operational changes." An additional objective of the future monitoring and reporting program must be to address the condition described by Env-Ws 388.20(a)(1). This rule describes the need to conduct ongoing monitoring upon operating a withdrawal when withdrawal testing data is not sufficient to verify that adverse impacts from a large withdrawal will not occur. Although the withdrawal test included a substantial number of monitoring points, much of the response observed from shallow overburden and surface water monitoring locations was dominated by very high

precipitation and highly variable climatic conditions. These influences caused the water level in the shallow monitoring wells to rise at an order of magnitude higher than the typical range of drawdown that is caused by a ten day withdrawal test. This means that even when corrections for precipitation are applied, it is most likely that much of the wetland environmental monitoring data will be ambiguous (emphasis added). Furthermore, the residential monitoring well network did not extend far enough in the westerly direction and the report acknowledges on page 35 that "similar minor mitigation steps might be required at very few other private wells located within the SWP that were not monitored during the withdrawal test."

The future monitoring program needs to include provisions to address the data collection inadequacies of the withdrawal test. Accordingly, the scope and intensity of the proposed future monitoring program must be to ensure adverse impacts will not occur to water resources or users identified by Env-Ws 388.07(d) and (e) and 388.15 as required by Env-Ws 388.20. The future monitoring program must include the monitoring of representative sites in accordance with Env-Ws 388.20(b) to meet the objective of Env-Ws 388.20(a)(1). Please revise your proposed monitoring plan accordingly." (emphasis added).

Restated below is the Department's full comment from its August 2003 letter that was only partially summarized by Barrington:

"14) Impact to Wetland Functions and Values: Page iv (paragraph 6) states "Minimal drawdown being observed in the shallow overburden deposits (on the order of 2 feet)...". Two feet of drawdown in the shallow overburden may be significant. The lowering of shallow water by two feet may dewater submerged wetlands (including prime wetlands) or lower the water table below the root zone of wetland vegetation, thus adversely impacting natural resources and causing adverse impacts to occur as described by Env-Ws 388.18(c)(6) and (7). The application does not assess if two feet of drawdown may impact the functions and values of wetlands as required by Env-Ws 388.16 using the criteria for impacts to water resources specified in Env-Ws 388.18(c)(6) and (7) or propose detailed monitoring, reporting, or mitigation plans in accordance with Env-Ws 388.20 – 388.21 for representative water resources identified in Env-Ws 388.09(d) as required by Env-Ws 388.20(a) and (b) (emphasis added). It is also unclear if the conclusion on page iv applies to all representative water resources potentially impacted by the withdrawal as described in finding 13 above, or if it applies only to select areas that were monitored during withdrawal testing.

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2)."

Barrington's comments to the Department do not accurately describe the Department's previous comments or findings in its April or August 2003 letters. Furthermore, Barrington's comments do not correctly describe the provisions of Env-Ws 388 to compensate for data gaps associated with withdrawal testing by developing monitoring, reporting, and mitigation programs to ensure adverse impacts do not

occur to existing water users or water resources. Lastly, Barrington's comments do not consider the detailed monitoring, reporting, and mitigation programs for wetlands, including Barrington's Prime Wetlands, that were submitted by USA Springs on August 12 and September 11, 2003 after the Department issued its August 12, 2003 letter.

In another comment provided on May 24, 2004, Barrington states:

The Applicant's failure to adequately assess wetland impacts is further described in a letter from ENSR International dated March 19, 2003 to DES. ENSR, serving as DES's consultant for the USA Springs application, states that the Applicant "presents almost no data characterizing the geologic deposits beneath BPW -40. ... With this nearly non-existent geologic characterization, one cannot predict accurately the magnitude of leakage that would occur in response to head differences between the wetlands and the shallow overburden."

Additional observations offered by ENSR include the following:

The [Applicant's] reports conclusion that the leakage rate will be reduced by 0.16 cu. ft./min is deceptive. If the calculations are correct, there is not just a reduction in upward leakage; there is actually an elimination of the upward vertical gradient that might drive groundwater discharge to the wetland under non-pumping conditions. Thus, even under the relatively high flow conditions under which the pumping test was conducted, pumping the USA Springs wells may cause groundwater discharge to the wetlands to cease."

In its summary of conclusions, ENSR states that USA Spring's "leakage analysis is flawed and not based on conservative assumptions."

USA Springs suggests that future monitoring can adequately address any adverse impacts due to the dewatering of the wetlands. Such an approach, however, defeats the purpose of the regulations which is to accurately assess impacts to wetlands in an effort to determine the extent and nature of any potential adverse impacts. Inadequate monitoring of the wetlands is not a substitute for the inventory, characterization and assessment that are required to take place both prior to and after the pumping test.

What is plain from the ENSR report and numerous other comments submitted is that the monitoring program proposed by the Applicant is not offered to address test-related "uncertainties" but to substitute for assessment and characterization of impacts that are required to take place prior to and after a pumping test. Proper assessment and characterization could have been performed by the Applicant but it chose not to do so. Such an omission cannot now be declared as "test-related uncertainty" and be addressed by monitoring.

The last submittal made from ENSR to the Department was on March 19, 2003. ENSR provided the Department with its findings on USA Springs' February 2003 Final Report. ENSR has not provided the Department with any new information since that time. ENSR's comments are virtually all consistent with comments provided by the Department to USA Springs in letters dated April 11, 2003 and August 12, 2003. USA Springs responded to the Department's comments in these letters in submittals made to the Department on August 12, 2003 and September 11, 2003. Information contained in these documents included additional information from three borings describing the geologic deposits beneath the wetlands. ENSR has not reviewed or made comments on these documents, and therefore it is inappropriate to

extrapolate ENSR findings in March 2003 pertaining to USA Springs' February 2003 Final Report to subsequent submittals containing new information. Also, Barrington did not completely restate ENSR's comments from March 2003. ENSR's letter clearly states that monitoring, reporting and mitigation plans should be developed to address uncertainties and on page 2, paragraph 3, ENSR states the following:

"Even if re-analyses of the data using a precipitation correction indicates that there are no immediate and irreversible impacts (per Env-Ws 388.20) due to pumping, detailed monitoring and mitigation plans may still be required. Unless data analysis indicate convincingly that adverse impacts will not likely occur, detailed mitigation action plans should be offered regarding both domestic wells and BPW#40. Such plans should propose both triggering thresholds for domestic wells and wetland observations, and also specific responses in each case. In its present form, the Report is probably over optimistic in its assessment of potential impacts, and lacking sufficient monitoring and mitigation plans."

USA Springs submitted a comprehensive monitoring, reporting and mitigation program for wetlands, including the Barrington Prime Wetlands in its September 11, 2003 submittal. The mitigation program includes trigger thresholds to mitigate potential adverse impacts. The mitigation program has been incorporated into the conditions of the large groundwater withdrawal permit.

5.6 Little River and Lamprey River

Several recommendations made to the Department state that the Little River and the Lamprey River will be adversely impacted by the withdrawal at USA Springs. Nottingham's consultant stated that USA Springs will cause adverse impacts to these surface water bodies and provided the following detailed comments on behalf of Nottingham on May 21, 2004:

The applicant was urged, on various occasions, to discuss the ramifications of the proposed groundwater withdrawal on surface water. To date, no such discussion has been offered by the applicant. The majority of the site Study Area (Figure 3-1 of the 3 February 2003 Gradient Report) lies in the Little River watershed. The Little River is a tributary to the Lamprey River. The USGS has a stream gage on the Lamprey River with records that extend back to 1934. At the USGS gage, the Lamprey River watershed area is 183 square miles. The daily flow data at the gage exhibit a median flow of 167 cfs.

The Little River watershed is 12 square miles at its confluence with the Lamprey River. In order to develop stream flows for the Little River, upstream of the USGS Lamprey River gage, a weighting factor based on watershed area is used, as is recommended in the NH DES instream flow methods. Using the ratio of watershed areas (12 sq. mi./183 sq. mi.), the ratio is multiplied times the gage data to get an approximation of the daily flows for the Little River. In doing so, for example, the median flow of the Little River is then 11 cfs. By compiling all of the estimated daily Little River flows, a flow duration curve can then be generated (Figure 28). In addition, monthly flow duration curves can also be generated. Figure 29 shows a magnification of the flow duration curves for all data as well as the months of August and September (normally the two lowest flow months of the year). It is apparent that the Little River (based on the Lamprey River gage data) never runs dry. The lowest estimated flows are 0.2 to 0.08 cfs. In comparison, the pumping of 309,600 gpm is equivalent to 0.5 cfs. If the natural discharge of the bedrock groundwater is to tributaries of the Little River (as evidenced by the well couplet data), then the proposed large groundwater withdrawal has the potential to dry-up the Little River. In addition, because the

applicant does not know the lag time between groundwater pumping and river flow, if this withdrawal were to be permitted with the stipulation that withdrawals be cutback in low river flow times, the applicant and NH DES do not know the amount of lag time at which to start the cutback. It is possible that the lag time is months to years, in which case we could never count on cutbacks to bring back the Little River flows during the low flow periods: rarely can we accurately predict drought and low flow more than days in advance. Removing large quantities of water from the Little River watershed is an important issue since flow in the Lamprey River serves as water supply, creates habitat, and dilutes pollutants. None of these issues has been discussed by the applicant.

It is noteworthy that of the 70 years of record on the Lamprey River, the three lowest flow periods occurred in 1994, 1995 and 2002, and the lowest flow ever recorded was 1994. This recent spate of drought may be related to large-scale issues such as global climate change, or more watershed-based factors, such as increasing population (and therefore water demand) since 1960. The reality is that the watershed will continue to see increasing population and demand for water resources. This needs to be factored into any decision on the long term permitting of water withdrawals, especially withdrawals that return little flow to the watershed.

The USGS has studied the impact of groundwater withdrawals and stream flow reductions in the Ipswich River watershed. They noted that groundwater withdrawals, and not surface water withdrawals, had the most dramatic consequence to the flow duration curves for the Ipswich River for the low flow periods (Zariello and Ries, 2000, USGS WRIR 00-4029).

By ignoring any discussion of surface waters and the impacts of this withdrawal on surface waters, the applicant has not complied with Env-WS 388.04.c.12 or Env-WS 378.10.b.1. In addition, the applicant has completely ignored the existing environmental role of this groundwater: that is, where the groundwater recently flows towards and discharges. This then does not comply with the requirement of Env-WS 388.06.j or Env-WS 389.07. NH DES has a role in stewardship of the Lamprey River and its tributaries, especially since the Lamprey River is designated as a Wild and Scenic River. This role must consider the effects of the large groundwater withdrawal on instream flow, reductions in water quality, and water supplies. If the applicant does not address these issues in the application for a large groundwater withdrawal, then NH DES must deny the permit for lack of compliance with statutes. It is recommended that NH DES find that the applicant has not complied with Env-WS 389 in that it has not evaluated the impacts of this withdrawal on surface waters and surface water users specifically the Lamprey River and its tributaries. The applicant has not demonstrated that the loss of bedrock groundwater in this watershed does not constitute an adverse effect and therefore on this ground this application be denied.

Because USA Springs has not requested approval for a new bottled water source in accordance with Env-WS 389, the Department makes no findings regarding Nottingham's recommendation pertaining to Env-WS 389.07.11. Similarly, USA Springs has not and never has indicated that it is seeking a new source of water for a small community water system. Therefore, the Department makes no findings pertaining to Env-WS 378.10(b)(1) as recommended by Nottingham. The Department finds that USA Springs complied with Env-WS 388 and that the Little River and Lamprey River will not be adversely impacted by the proposed withdrawal.

Env-WS 388 requires that an applicant delineate a study area in accordance Env-WS 388.06(i) and (j), and ~~to assess impacts to water resources within this area. The criteria specifically states.~~

- (i) The conceptual hydrologic model shall include:
- (3) Delineated extents of the study area, with the assumption of a conceptual hydrologic model condition of 180 days of continuous pumping at maximum volumes without recharge from rainfall or snowmelt, including all of the following items:
 - a. The maximum extent of the cone of depression created by the withdrawal;
 - b. The maximum extent of the recharge area for the withdrawal; and
 - c. The downgradient area of the withdrawal.
- (j) The downgradient area of the withdrawal shall include:
- (1) The area where water taken by the withdrawal would flow if the withdrawal did not operate;
 - (2) The area that will provide water to the downgradient area when the withdrawal is operating; and
 - (3) The point where the amount of water to be withdrawn is negligible when compared to the amount of water crossing the boundary using one of the following methods:
 - a. An existing or new delineation of a watershed large enough so that the size of the entire study area for the withdrawal is at least 10 times the size of the recharge area for the withdrawal;
 - b. An existing or new delineation of a watershed where the amount of water crossing the downgradient boundary, that is, leaving the study under current conditions, is at least 10 times the amount to be withdrawn; or
 - c. An alternative method of estimating a study area provided it:
 - 1. Relies on conservative assumptions;
 - 2. Is demonstrated as appropriate for the site by testing results; and
 - 3. Is clearly explained and justified using test results in the report developed pursuant to Env-Ws 388.17.

Subparagraph (j)(3), above, provides three different methods for delineating the downgradient area of the study area. The Little River and the Lamprey River are located downgradient of the USA Springs site. An applicant must only comply with the criteria for just one of the methods of delineating the downgradient area of the study area. USA Springs complies with two of the methods (Env-Ws 388.06(j)(3)b and Env-Ws 388(j)(3)c), and almost complies with the third method stated Env-Ws 388.06(j)(3)a (The size of the study area is approximately 9 times larger instead of 10 times larger than the size of the recharge area). The study area for USA Springs terminates at Mendums Pond which discharges water to the Little River through a dam and spillway. Therefore, the Department finds that USA Springs has delineated the study area of the proposed withdrawal in accordance with the requirements of Env-Ws 388. The Little River and the Lamprey River do not fall within the Study Area delineated in accordance with Env-Ws 388. Consequently, adverse impacts as defined by Env-Ws 388 cannot occur to these water bodies.

However, the Department provides below the following additional information beyond what is required by Env-Ws 388 that assesses impacts to these water bodies because of the number of comments and recommendations received.

Mendums Pond spans the headwaters of the Little River which flows southeasterly for a distance of approximately 7 miles to its confluence with the Lamprey River. The thirty-one foot high dam on

Mendum's pond is owned and operated by the Department's Dam Bureau. From Mendum's Pond, the Little River Flows southeast into Nottingham Lake and continues south where water is discharged through a dam. From there, the river continues southeast until its confluence with the Lamprey River. Therefore, approximately 9 miles of stream channel and two impounded reservoirs separate the USA Springs site and the Lamprey River.

Mendums Pond is fed by twelve brooks in four subwatersheds that drain 6.8 square miles. One of the brooks discharging to Mendums Pond is partially fed by an unnamed stream that flows into Round Pond which then discharges via a stream named Perkins Brook into Mendums Pond. The inlet of Perkins Brook into Mendums Pond is two miles away from the location of the unnamed stream at the USA Springs site. The pond stores over 1.7 billion gallons of water when at full capacity and covers an area of 265 acres. The Dam is thirty-one feet in height and is estimated to increase the water level in the pond by seventeen feet. The water level in the pond is deliberately lowered by seven feet from the late fall to the early spring of each year to allow for shore maintenance and to increase flood flow storage capacity for run-off associated with the spring snow melt. The pond lies directly over a regional bedrock fault (the Flint Hill Fault). The hydrologic budget of the pond was studied from November 1987 through October 1988 by the Department, and findings are available in a report titled, "Mendums Pond Diagnostic/Feasibility Study - NHDES-WSPCD 92-4". During this period, monthly precipitation was slightly below average, but very large precipitation events occurred in July and August of that year.

- The Feasibility Study evaluated the monthly hydrologic budget for Mendums Pond from November 1987 to October 1988. The report stated that from November 1987 to October 1988, 2.2 billion gallons of water were discharged to Mendums Pond from its tributaries. The report also states that another 0.4 billion gallons of water entered the pond directly from precipitation. If USA Springs withdrew the maximum amount of water allowed by its permit, then it would extract 0.1 billion gallons per year or 4% of the water that enters Mendums Pond annually. This assumes that all of the water captured by the wells at USA Springs would have otherwise flowed to Mendums Pond.
- Through extensive testing with seepage meters, the report determined that the contribution to recharge of groundwater from the pond to the water budget is insignificant and does not account for more than 3% of the water budget. Also, the elevation of the full lake water level in Mendums Pond is 225 feet mean sea level. The estimated water level in bedrock wells monitored near the pumping wells after pumping 180-days with no recharge to groundwater is estimated to be 340-380 feet mean sea level. Conditions in the permit ensure excessive dewatering of the aquifer will not occur. As a result, the water level in the bedrock aquifer near the USA Springs site will always be at least 100 feet above the elevation of the water level elevation of Mendums Pond. This means direct dewatering of Mendums Pond via induced infiltration of the surface water to the groundwater by pumping at USA Springs will not occur.
- If adverse impacts occur to any surface water body near USA Springs, these would most likely be in the watershed near the unnamed stream that flows by the USA Springs site into Round Pond and then Perkins Brook. These impacts would most likely occur between the USA Springs site and Round Pond. The Department agrees that some of the monitoring data obtained during the withdrawal testing program indicates that the proposed withdrawal may impact surface water bodies. Also, some other data from the withdrawal testing program is too ambiguous to rule out the potential for impacts because of the wet weather conditions that occurred before and during the test. In consideration of these conditions, the Department required USA Springs to develop a

comprehensive monitoring, reporting, and mitigation program in accordance with Env-Ws 388. The programs have been included with the conditions of the large groundwater withdrawal permit and have to be implemented.

- It is not possible for USA Springs to adversely impact the water levels or flows in Mendums Pond, Little River, or the Lamprey River for five months of the year (November – March/April), because the water level in the Mendums Pond is controlled by the Department by controlling discharges through the dam outlet.
- During the 1987-1988 study monthly water budgets were developed for the pond. The driest month of the Study Period was in June 1988. In June, 65 million gallons of water was added to the pond via flow through tributaries, groundwater recharge, and direct precipitation. During that same time, 31 million gallons of water was released through the impoundment, meaning that over 1 million gallons per day of flow was withheld from the Little River to maintain water levels in Mendums Pond. The impact of holding over 1 million gallons a day to maintain the aesthetic value of Mendums Pond immediately adjacent to the Little River is directly measurable. However, the impacts on the water level or flow through Mendums Pond from a withdrawal of 0.31 million gallons per day from the bedrock aquifer at the USA Springs site, located 2 miles away, are not directly measurable. Furthermore, the specific effects of such a withdrawal would attenuate such that it is extremely unlikely that any impact could be observed at or downgradient of Round Pond, which is upgradient of Mendums Pond.

As previously described, the Little River begins at Mendums Pond, immediately below the dam which is located on the southern end of the pond. Because flow out of Mendums Pond is substantially controlled during the summer and fall low flow periods, the flow on the Little River is normally less than what the natural hydrograph would exhibit. The impacts of USA Springs' withdrawals would be attenuated upgradient at Mendums Pond, and the stream upgradient of Round Pond would be much more susceptible to impacts associated with large groundwater withdrawals.

Because the USA Springs withdrawal cannot solely adversely impact Mendums Pond, it also cannot adversely impact flows in the Little River flowing from Mendums Pond which are primarily controlled by the regulation of the impoundment on the pond. The Little River flows almost 3 miles from the dam at Mendums Pond to Nottingham Lake, which is also impounded. The water level in this pond is also maintained at the maximum level possible from April through October by capturing inflow into the lake and retaining the water as storage, or to offset evaporative losses. This means that flow downgradient of the Nottingham Lake back to the Little River is diminished during typical low flow periods, and that only water that leaks from the dam or overflows the dam during or after periods of precipitation is available for flow to the Little River. Water in Nottingham Lake is artificially drawdown 1.7 feet by manipulation of the impoundment from November through March (similar to the drawdown in Mendums Pond). Direct impacts associated with USA Springs' withdrawal are likely not measurable in the Little River downgradient of Nottingham Lake.

From the impoundment at Nottingham Lake, the Little River flows a little less than three miles to its confluence with the Lamprey River. Because no impact from the withdrawal at USA Springs could be observed in Mendums Pond, the Little River flowing from Mendums Pond, Nottingham Lake, and the again the Little River flowing from Nottingham Lake, the flow of the Lamprey River will not be measurably impacted by the withdrawal at USA Springs.

Comparisons to the Ipswich River Basin in Massachusetts/Comprehensive Watershed Management

Nottingham describes and references a recent study (Zariello and Ries, 2000, USGS WRIR 00-4029) completed for the Ipswich River Basin in Massachusetts as evidence that "groundwater withdrawals and not surface water withdrawals, has the most dramatic consequence to the flow duration curves for the Ipswich River for the low flow periods". Again, the Lamprey River is located nine miles from the USA Springs site and separated from the site by two reservoirs which control flow to the river during low flow periods. Second, during the river low flow months of July, August, and September, the same study referenced by Nottingham states that the Commonwealth of Massachusetts prohibits or severely restricts withdrawals from surface water bodies forcing water users to rely on groundwater sources of water. And, the majority of these groundwater sources are located immediately adjacent to the Ipswich River or its tributaries. Sixty-six percent of the water extracted in the basin during river low-flow periods comes from groundwater sources. Therefore it is quite logical that groundwater withdrawals along with climatic conditions are the primary reason low flow conditions exist in the Ipswich River Basin. Lastly, the Ipswich River Basin is 155 square miles and on average there are approximately 22.9 million gallons of water withdrawn daily from groundwater and surface water sources. The Little River Watershed is 20.58 square miles. In the Lamprey River Watershed, approximately 0.56 million gallons a day will be withdrawn daily when USA Springs begins operations and if it withdraws its maximum permitted production volume. This means that for the Ipswich River Basin, 0.15 million gallons of water is withdrawn per square mile. Approximately 0.027 million gallons of water would be withdrawn from the Little River Watershed per square mile, or a ratio that is five and a half times less than the Ipswich River Basin. The Ipswich River and Lamprey River Watersheds present completely different circumstances and cannot be directly compared for the purposes of this permitting decision.

Methods to Manage Cumulative Impacts and to Increase or Maintain Flows in the Lamprey

The USA Springs site will not cause a measurable impact in the water that flows in Mendums Pond, the Little River, Nottingham Lake, or the Lamprey River. However, the cumulative impacts of all stresses that alter the natural occurrence of water in the watershed will impact seasonal high and low streamflows.

In the early 1990s, the legislature adopted Instream Flow protection requirements under the Rivers Management and Protection Act (RSA 483). The purpose of this law is to ensure that a process is in place to manage water resources as the state's population increase and cumulative impacts associated with water use for drinking, business and recreation place increasing and often-conflicting demands on our river waters and associated habitat. The Act gave the Department the authority and responsibility to maintain flow to support instream public uses in rivers including navigation, recreation, fishing, conservation, maintenance and enhancement of aquatic life, fish and wildlife habitat, protection of water quality and public health, pollution abatement, aesthetic beauty, and hydropower production.

The Department adopted the rules in 2003 (Env-Ws 1900). Env-Ws 1900 applies to:

- (a) Designated segments, under RSA 483, on the Lamprey and Souhegan Rivers and their tributary drainage areas;
- (b) Affected water users on the Lamprey and Souhegan Rivers; and

(c) Affected dam owners on the Lamprey and Souhegan Rivers.

The rules define affected water user as "a water user required to be registered under Env-Wr 700, or successor rules, and having a withdrawal or return location within 500 feet of a designated river or within 500 feet of a river or stream in its tributary drainage area." Anyone who withdrawals, discharges or transfers more than 20,000 gallons of water a day must be a registered water user.

Two of USA Springs' wells (USA-1 and 2) are located within 500 feet of a tributary that eventually discharges to the Lamprey River approximately 9 miles away. Therefore, instream flow rules as currently developed by the Department and stakeholder group will apply directly to two of USA Springs' wells. The location of the other pumping well (USA-4, the lowest yielding well) does not meet the definition of "affected water user". Once protected flows for the watershed are established, all activities that impact water flow to the Lamprey River will be appropriately considered cumulatively such that instream flows are protected.

5.7 *Public Trust and Reasonable Use*

The combined effects of multiple, large withdrawals of any kind within an aquifer or watershed creates potential conflicts between the State's interest in protecting water resources and private groundwater water rights. Many of the comments submitted to the Department argue that the state cannot allow a large withdrawal of water for "private for profit" use because it holds the water in "public trust" and that such a proposed withdrawal is inherently unreasonable. However, this approach advocated by the public is not within the Department's discretion under the criteria established in RSA 485-C.

The permit issued by the Department ensures that detailed measures are in place to prevent the occurrence of adverse impacts. And, the permit does not issue a blanket approval to withdraw water indefinitely at the permitted level. Instead, the permit requires monthly and yearly monitoring and reporting of environmental measurements that assess impacts. The permit also requires mitigation whenever a potential for an occurrence of an adverse impact is identified. Pursuant to Env-Ws 388.24, permits expire every ten years and must be renewed in accordance with Env-Ws 388.26. The permit renewal process requires that the permit application for Env-Ws 388 be completed again, which means that impacts to existing water users and water resources at the time of the permit renewal will be comprehensively assessed. The permit issued to USA Springs contains many conditions that limit the potential for this withdrawal to affect the existing or long-term sustainability of the aquifer. Condition 6(e) of the permit ensures that withdrawals at USA Springs will operate in a sustainable manner, and that the data will be continuously reviewed by the Department to verify such. Also, Condition 6(e) establishes aquifer water level thresholds that limit the amount of water that USA Springs may extract based upon measured water level elevations in the bedrock aquifer. This means that if new groundwater withdrawals from new developments in Nottingham occurs and these withdrawals coupled with withdrawals at USA Springs cause the water levels to fall below established thresholds, then USA Springs might have to reduce its withdrawal volume to maintain aquifer water levels. Similarly, the monitoring and reporting requirements in Condition 5 of the permit ensure that potential for adverse impacts will be monitored during the 10-year life of the permit. If the potential for impacts are identified, then Condition 6 of the permit ensures implementation of mitigation measures to address the adverse impacts. Finally, the Department has authority to modify the permit at any time pursuant to Env-Ws 388.24(d) to prevent adverse impacts from occurring.

The Department finds that the large groundwater withdrawal permit issued to USA Springs in accordance with Env-Ws 388 ensures the withdrawal will be managed in a reasonable manner. The permitted withdrawal will not interfere with reasonable use by downstream riparian owners or groundwater users or and present or future interests associated with the water needs for the public, fishing, recreation, and wildlife habitat.

Nottingham has provided the Department with recommendations and comments stating that USA Springs' proposed withdrawal is unreasonable and not consistent with the anticipated population growth of the region. However, it is important to note that it is very unlikely that a large groundwater withdrawal permit would have ever been filed with the Department had Nottingham not granted a zoning variance for the development of USA Springs' property. Without this variance, USA Springs could not have operated a bottled water business on its property. On May 1, 2001, Nottingham approved a zoning adjustment for USA Springs to construct and operate a bottled water facility on land that was not zoned commercial or industrial. USA Springs' application to the Zoning Board of Adjustment stated that its wells were capable of producing 300 gallons per minute. The zoning board approved USA Springs' application four votes to zero with one member of the board abstaining (see Appendix 4). Regional growth issues and concerns are directly within the control of local land use regulations at the town level. They are not directly relevant to a large groundwater withdrawal permit issued pursuant to Env-Ws 388.

5.8 Prime Wetlands

Barrington has provided the Department with the following comment regarding USA Springs' Large Groundwater withdrawal and designated Prime Wetlands in its borders:

"In both USA Springs first application and its most recent effort, the Town of Barrington has requested that DES conduct a prime wetland hearing in accordance with RSA 482-A: 11, IV. While DES has not responded to the Town of Barrington's most recent request, during the process for USA Springs' first application, DES stated that "the presence of a proposed zone of influence in or adjacent to a prime wetland does not trigger the prime wetland hearing requirements of RSA 482-A:11, IV" and "[i]t is DES's conclusion that a separate prime wetlands hearing is not required for permits issued under RSA 485-C."

Env-Ws 388.18(c)(7) provides that when there is a net loss of values for wetlands as set forth in RSA 482-A, there is an adverse impact. This provision, by referencing RSA 482-A, not only captures wetlands but also prime wetlands and the heightened level of scrutiny given to activities in or adjacent to prime wetlands must be followed. To not examine the impact of the proposed large groundwater withdrawal on BPW -40 in accordance with RSA 482- A effectively wipes out the Town of Barrington's effort to identify and protect BPW-40 as a prime wetland. BPW -40 is entitled to the full protection intended for it under New Hampshire law and neither RSA 485-C nor its implementing regulations purport to trump or substitute this process. Accordingly, DES is required to hold a public hearing and determine by "clear and convincing evidence" whether the dewatering of BPW-40 will result in the significant net loss of the values set forth in RSA 482-A:1.

DES asserts in its June 12, 2003 letter, that because USA Springs has applied for a permit pursuant to RSA 485-C, and since there has been a public hearing held under the provisions of that chapter, DES need not hold a prime wetland hearing pursuant to RSA 482-A:11, IV. DES states that "[a] separate

hearing on prime wetlands would be unnecessarily duplicative. ... " / " DES offers no authority in support of this position. Indeed, there is no authority for the proposition that the provisions of these two discrete statutes are fungible or interchangeable.

RSA 482-A provides prime wetlands with a heightened level of protection not available under RSA 485-C. RSA 482-A states that DES shall not grant a permit:

with respect to any activity proposed to be undertaken in or adjacent to an area mapped, designated and filed as a prime wetland [. . .] unless the department is able, specifically, to find clear and convincing evidence on the basis of all information considered by the department, and after public hearing, that the proposed activity, either alone or in conjunction with other human activity, will not result in the significant net loss of any of the values set forth in RSA 482-A: 1.

RSA 485-C requires only that: the department shall hold a public hearing on the application in the municipality in which the proposed withdrawal is to be made upon the request of the governing body of any municipality or supplier of water within the anticipated zone of contribution, provided that such a hearing is requested within 15 days of receipt of the application.

There are significant and obvious differences between these two standards and giving effect to RSA 485-C:21, III does not suffice to meet the higher standard set by RSA 482-A. DES is bound by the tenor of the statute and has a duty to give effect thereto.

In June and July of 2003, DES sought to assure the Town of Barrington that BPW-40 would be adequately protected under RSA 485-C; that the pre on-site activity protection afforded prime wetlands under RSA 482-A would exist under RSA 485-C. True to its word, on August 11, 2003, DES found that the information in the USA Springs Final Report was not complete and correct as to assessing impacts to wetland functions and values, and cited it as a basis upon which to deny a permit. On September 11, 2003, USA Springs declared its omission was a "test-related uncertainty" and made a plea for monitoring in lieu of a complete and correct report. The apparent acceptance by DES in its December Decision of the Applicant's position stands as proof that RSA 485-C does not provide the level of protection given prime wetlands under RSA 482-A. The DES now has a second chance to correct its earlier position and allow BPW-40 the protection the Town of Barrington thought it was providing to these valuable natural resources in 1991.

In addition to the June 18, 2001 public hearing, the Department conducted public information meetings in Nottingham on July 17, 2001, August 29, 2002, and October 14, 2003 and in Barrington on August 1, 2001. These types of public meetings have also been offered and conducted for other large withdrawal permit applications.

The Department finds that the presence of a zone of influence in or adjacent to a prime wetland does not trigger the Prime Wetland hearing requirements of RSA 482-A:11, IV. The permit activities referenced in RSA 482-A:11, IV relate to dredge and fill permits, not all permits issued by the Department.

Barrington states: "RSA 485-C requires only that: the department shall hold a public hearing on the application in the municipality in which the proposed withdrawal is to be made upon the request of the governing body of any municipality or supplier of water within the anticipated zone of contribution, provided that such a hearing is requested within 15 days of receipt of the application." The requirements

of RSA 485-C and Env-Ws 388 are much more extensive than what Barrington has described and include comprehensive protection to all water resources and water users as described in detail in Section 3.0. The Department finds that the large groundwater withdrawal permit issued to USA Springs in accordance with the requirements of Env-Ws 388 ensures that no adverse impacts as described by Env-Ws 388.18, including no net loss of the values and functions of Barrington's Prime Wetlands, will occur.

The Department finds that adequate opportunity for public comment and participation occurred as required under RSA 485-C. Between the two permit applications submitted by USA Springs, the Department has accepted comments at three public hearings (June 18, 2001, February 5, 2004 and April 7, 2004) and at four public meetings (July 17, 2001, August 29, 2002, and October 14, 2003 in Nottingham and in Barrington on August 1, 2001). Subsequent to all public hearings and meetings, written comments were received. The Town of Barrington has been represented at all of the hearings and meetings and has submitted detailed comments.

5.9 USA Springs' Response to the Department's August 12, 2003 Letter

Since the Department issued its written decision regarding USA Springs' large groundwater withdrawal application on December 11, 2003, it has received many comments alleging that the Department "downgraded" its requirements for issuing a large groundwater withdrawal permit stated in its letter dated August 12, 2003 which denied the permit. In fact, as discussed below, the Department has appropriately reacted to new information provided by USA Springs. The Department's comments and findings contained in a Final Decision letter on August 12, 2003 are repeated below. Following each finding is an explanation of how USA Springs subsequently complied with the requirements of Env-Ws 388 by submitting supplemental information after the Department August 12, 2003 decision. USA Springs then supplemented its original information by submittals on August 12, 2003 and then again on September 11, 2003 as part of its request for rehearing.

- 1) *Conceptual Model - 180-day Recharge Period: Executive Summary, page i (paragraph 1) states: "in particular, this rate can be sustained even if there were no contribution to groundwater from precipitation at all for six months, an event which almost never occurs in New Hampshire". In New Hampshire, water levels in all types of aquifers typically decline every year from the month of May through the month of October, because very little precipitation replenishes aquifers during this period (see data collected by the United States Geological Survey at <http://nh.water.usgs.gov/Publications/annual01/A8.gwlevels.pdf>). The rate of decline varies, being greater during periods of drought and less during wet weather periods. The application indicates 1) The no recharge condition of 180 days is overly conservative; and 2) The results of the withdrawal test reflect this condition. Neither of these assertions is correct. The no recharge condition closely represents yearly seasonal low recharge conditions and the data obtained from the withdrawal testing program and associated analyses have not been calibrated to reflect this condition as repeatedly stated in the application. Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 and Env-Ws 389.19 is: 1) Not complete or correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20(a); and 2) Not assessed accurately to demonstrate that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).*

By letters on August 12, 2003 and September 11, 2003, USA Springs submitted supplemental information that reasonably corrected withdrawal test data for the effects of precipitation and to more

accurately assess potential impacts to water users and water resources in accordance with the 180 day no net recharge to groundwater condition required by Env-Ws 388. Nottingham previously pointed out that USA Springs' approach to correcting for precipitation was not adequate because the water levels in some monitoring wells still exhibit a rise in elevation after the correction is applied. The Department does not agree with this assessment and instead finds that USA Springs developed and applied an appropriate and objective approach for correcting water levels. The Department agrees that some of the monitoring points showed an increase in water levels even after correcting for the effects of precipitation. The increase in water levels in monitoring points were caused by poor climatic conditions, complex hydrology, geology of the region, and statistical errors associated with mathematical functions used to apply corrections to data. Recognizing uncertainties may exist even with extensive hydrogeologic assessments, and that withdrawal testing conditions are not always controllable, Env-Ws 388 has provisions to address data gaps associated with withdrawal testing by developing and implementing monitoring, reporting, and mitigation programs as allowed by Env-Ws 388.17(b) and (c), and Env-Ws 388.20 and 21(a).

- 2) *Aquifer Storage/Source of Pumped Water: Executive Summary, page ii (paragraph 3), page 27 (paragraph 2) states: "Furthermore, although water available within storage will not be tapped due to the net water surplus....". Data from the report indicates that pumped water will be derived from both "recharge" and "storage" under virtually all conditions. During some time periods, such as the wet weather period when the withdrawal test occurred, the dominant source may be recharge with less pumped from storage than during "normal" conditions. However, the report data indicate that the withdrawal test created a zone of influence (Figures 3-13, 3-16, and 3-18) and thus storage was evidently being tapped to some degree even under the November 2002 withdrawal test conditions, which were relatively wet.*

Understanding the origin of water derived from a pumped well and its relationship to aquifer recharge, storage, and ultimately natural discharge is required by Env-Ws 388.06(l) and 388.14 and is fundamental element of an analysis to determine if the proposal is sustainable and will result in an adverse impact as defined by Env-Ws 388.18. It is also fundamentally important for delineating the wellhead protection area as required by Env-Ws 389.11(b) and Env-Ws 389.15. Water pumped from bedrock wells at USA Springs must either be derived from storage, increased recharge (induced infiltration of water stored in surface water bodies) caused by the pumping of the wells, and/or a decrease in natural discharge to the surface water resources. The degree that the withdrawal obtains water through one of these sources is essential for determining if an adverse impact may occur to private wells (by way of depleting storage) or water resources (by dewatering through increased recharge caused by pumping or by decreasing groundwater discharges to surface water bodies).

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 and Env-Ws 389.19 is: 1) Not complete or correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20(a); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

USA Springs' submittals dated August 12, 2003 and September 11, 2003 provided more accurate accounts for the potential impacts associated with depleting aquifer storage, inducing recharge from water resources, and decreasing discharge to water resources and included an adequate monitoring, reporting, and mitigation program.

- 3) *Potentially Conflicting Elements of the Conceptual Model: The conceptual model describing the relationship between recharge in the shallow overburden and the bedrock aquifer is not reconciled with the available data, or consistently developed and integrated. The application presents two conflicting conceptual models: (1) bedrock is vertically insulated from the surficial overburden and (2) bedrock is rapidly recharged by precipitation events so groundwater is not removed from local storage (i.e., bedrock wells are closely connected to the shallow overburden aquifer). Statements that reflect the conflict within conceptual models are presented below:*

Statements consistent with bedrock isolation from surficial overburden

- *On page 28, (paragraph 3), the report states "minimal response was noted in the shallow overburden deposits during the withdrawal test".*
- *On page 32- 33, the report suggests that bedrock is insulated and vertically distant from events that occur on the surface that might cause contamination of the bedrock aquifer.*
- *On page 34 of the report, it is explained "the water bearing fractures at the USA wells, especially USA-1 and 2 are at considerable depths below ground surface (ranging from 525-560 feet and 450-465 feet at USA-1 and USA-2 respectively); thus the water bearing fractures are naturally insulated (or vertically distant) from groundwater quality impacts identified in shallow overburden and the upper portion of the bedrock aquifer."*

Statements consistent with bedrock being closely connected to overburden

- *On page 26, the report states: "In addition, antecedent groundwater elevation data collected for approximately 4 weeks at residential bedrock wells indicated a significant (average 2.9 feet) increase in groundwater heads. These data demonstrate that the bedrock aquifer: 1) receives significant recharge from precipitation; and 2) responds relatively quickly to recharge events."*
- *The report states on page 30, paragraph 3 that "groundwater elevations at the on-site overburden piezometer/wells responded significantly (up to 7.5 feet at OW-1) and quickly in response to precipitation events during the antecedent monitoring." OW-1 is screened in till, immediately above the bedrock aquifer.*
- *The data presented on page 31 indicate that the observed increases in piezometric head in bedrock fractures were an order of magnitude greater than the amount of precipitation received, suggesting direct recharge to bedrock from precipitation.*
- *Also on page 31, the report states that "bedrock receives significant recharge from precipitation and the effect of recharge events are manifested within the bedrock aquifer (within days)", indicating that the bedrock aquifer is closely connected to the surface.*
- *Monitoring wells NBW and OW 1 exhibited water level rises during the withdrawal test. This may suggest that precipitation directly recharges bedrock.*

- *On page 23 of the report it is explained that "the dip of the primary fracture (NE-SW) was almost vertical (89° degree SE) consistent with one of the conclusions of the VLF survey." Vertical bedrock fractures could facilitate the direct connection of the deep bedrock aquifer with the shallow bedrock aquifer and possibly the overburden.*

The application presents a model whereby it depicts there being plentiful water available for groundwater development because the bedrock aquifer (source of water for the proposed well) is readily recharged by rain events, meaning that a strong connection of the ground surface and shallow overburden aquifers exist. But in sections of the application where a direct connection of the bedrock aquifer to shallow aquifers or surface water resources may present a model that could lead to the proposed withdrawal adversely impacting surface water bodies by dewatering or by altering the flow of groundwater contamination, the application presents a different model whereby the bedrock aquifer is isolated from shallow overburden aquifers and surface water bodies.

Accordingly DES finds that the information in the report produced in accordance with Env-Ws 388.17 and Env-Ws 389.19: 1) Is not complete and correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20(a); 2) Is not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2); and 3) Does not contain information demonstrating that the contamination source in the source water protection area is adequately controlled as required by Env-Ws 389.20.

The hydrogeologic conceptual model described in USA Springs' February 2003 Final Report for its first large groundwater withdrawal application presented two conflicting conceptual models: (1) bedrock is vertically insulated from the surficial overburden; and (2) bedrock is rapidly recharged by precipitation events. The conflicting nature of the hydrogeologic conceptual model is described in more detail in the Department's August 12, 2003 Final Decision which is attached as Appendix 1 to this document. USA Springs has not amended its application to correct the contradictions. In its February 2003 Final Report, USA Springs used its hydrogeologic conceptual model as the basis for arguing that very limited environmental monitoring, reporting and mitigation would be required to address impacts to water users and water resources. In its February 2003 Final Report, USA Springs argued that its proposed withdrawal would only tap surplus water and that neither the bedrock nor overburden aquifer would be tapped. It also promoted a scenario whereby the bedrock aquifer was readily recharged by precipitation, but at the same time the bedrock aquifer was relatively insulated from the overburden aquifer to the extent that their withdrawal would not adversely impact wetlands or alter the flow of contaminated groundwater.

Although USA Springs never reconciled contradictions in its conceptual hydrogeologic model it put forth in its February 2003 Final Report, it did substantially revise its application in submittals it made in August 12, 2003 and September 11, 2003 to acknowledge that contradictions exist in how data from the withdrawal test can be interpreted. To account for this, USA Springs then proposed an environmental monitoring, reporting, and mitigation program to address all impacts that could occur due to its withdrawal based upon a conservative-worst case interpretation of data contained in its application. This means instead of using contradictions in the conceptual model to propose limited to no monitoring and mitigation as it did in its February 2003 Final Report, USA Springs proposed extensive monitoring, reporting, and mitigation for all types of impacts that could occur from a new large groundwater withdrawal at its site. USA Springs' application is now adequate because it correctly assesses withdrawal testing data by stating accurately that there is uncertainty, and by comprehensively addressing this uncertainty in accordance with the requirements of Env-Ws 388.17(b), Env-Ws 388.20(a)(1), and Env-Ws 388.21(a)(2).

- 4) *Interpretation of Water Level Measurements:* The report analysis states that deeper overburden wells show a greater response to pumping than shallower overburden wells (pages 28-29). However, there are other relationships that could develop this response. For instance, the precipitation effects on the deeper wells could be delayed relative to the shallow wells. Similarly, withdrawal test effects on the shallow overburden could be delayed relative to the deep wells. In addition to a delay affect, the report analysis may be skewed or misleading because it interprets water level measurements that have not been corrected to account for the effects of precipitation as required by 388.09(a), 388.14, 388.09(h), and Env-Ws 389.11(c). Env-Ws 388.09(h) and Env-Ws 389.11(c) reference the pumping test requirements contained in Env-Ws 379.11.

Understanding the response of the bedrock aquifer and overburden aquifers to either precipitation events or to the pumping of large withdrawals is essential for assessing the potential for impacts to existing water resources and users as required by Env-Ws 388, as well as a fundamental component of an analysis required to determine the source of recharge to pumping for the purpose of delineating a wellhead protection area in accordance with Env-Ws 389.11(b) and 389.15.

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 and Env-Ws 389.19 is: 1) Not complete or correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20(a); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

USA Springs adequately addressed this comment by submitting supplemental information on August 12, 2003 and September 11, 2003 as described in the Department's findings to in Section 4.1 and comment 1 and 2, above.

- 5) *Historic and Residential Water Quality Data:* Preliminary water quality results obtained after installing the wells and during the groundwater discharge permitting process were not included in the conceptual hydrogeologic model discussion as required by Env-Ws 388.06(c)(1). Historic data obtained from previous investigations are included in hydrogeologic studies as standard practice. This data is commonly used to: 1) Verify the existing data quality; and 2) Reflect any changed conditions including an assessment of the cause of any changes. Where discrepancies exist between studies, a technical explanation needs to be provided and the data quality qualified accordingly. When information from multiple studies is consistent, more confidence is placed on the data, analysis, and recommendations contained in a given proposal.

In USA Springs' case, for example, Radium 226+228 exceeded drinking water standards set forth by Env-Ws 315.60 (which is referenced by Env-Ws 389.11(c)(3)c and 389.22) in the sampling conducted in October 2002, but is well below these standards in samples collected in November 2002. These results should be assessed to determine if groundwater derived from the pumping wells will meet drinking water standards or require treatment. Also, many of the results of water quality sampling conducted in September 2000 and October 2002 indicate that groundwater obtained from USA Springs' wells exhibit elevated concentrations of iron and manganese, and sometimes above the enforceable secondary water quality standards set forth by Env-Ws 319. The results of the water quality sampling conducted in November 2002 continue to show elevated concentrations of manganese, but this sampling event indicated that there are low concentrations of iron in the groundwater derived from USA Springs' wells. Based upon the conflicting sampling results, it is

unclear if groundwater derived from USA-1, USA-2 and USA-4 will require treatment to continuously meet safe drinking water standards to meet the objectives of Env-Ws 389.11(b)(3) or (4).

Information in Section 3.4.1 of the application regarding the water quality relative to the private wells tapping the same bedrock aquifer is also not of sufficient detail to establish an understanding of baseline water quality. Due to insufficient detail in the final report and inconsistent water quality results, the baseline water quality of the bedrock aquifer is unclear. This needs to be established and documented in the application so that any changes in the water quality of groundwater derived from the bedrock aquifer can be assessed to determine if an adverse impact has occurred in accordance with Env-Ws 388.18(c)(10).

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 and Env-Ws 389.19 is not complete and correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20(a).

USA Springs provided supplemental information to the Department on September 11, 2003 that addresses this comment and the requirements of Env-Ws 388. This information explains how the Department may gain access to the water quality data from private wells, and that USA Springs intends to use treatment to treat the water derived from its wells for naturally occurring contaminants. Treatment for naturally occurring contaminants would be a condition of the New Source of Bottled Water approval if and when that approval is applied for and issued at a later date.

- 6) *Withdrawal Testing Data Processing to Incorporate the Effects of Changing Weather Conditions: The basic purpose of the withdrawal test is to determine how the long term pumping of a proposed withdrawal will: 1) Affect the extent and nature of recharge to a multi-layer aquifer system potentially impacted by a proposed withdrawal; and 2) Impact the extent and location of natural discharge. The long term pump test should also provide an understanding of the zone of influence developed by a proposed withdrawal utilizing various analytical techniques that require aquifer water level measurements over time and production well discharge rates. This information, overlaid with an inventory of potential contamination sources and an inventory of water users and resources, is used to determine if a proposed withdrawal will be able to continuously produce water that meets drinking water quality standards and if the withdrawal will adversely impact existing water users or water resources.*

A withdrawal test is generally designed to collect data under pumping conditions over a relatively short period of time(5-10 days). This data is analyzed using analytical techniques to estimate the long-term impacts of a new withdrawal. When other hydraulic influences, such as rainfall, barometric pressure changes, snow melt, or water releases from impoundments, affect water level measurements prior to, during, or following a withdrawal test, these effects must be filtered out so that a valid understanding of the response of an aquifer system to pumping may be developed and used to estimate the magnitude of impacts associated with long-term pumping. For USA Springs, the adverse impact analysis for existing water users, water resources and wetlands is dependent on drawdown data collected during the withdrawal test, extrapolated to 180 days. The graphs of water levels presented in Appendix H, Table 3-8, Table 4-1, Table 4-2, Figure 3-13, Figure 3-14, Figure 3-15, Figure 3-16, Figure 3-17, Figure 3-18, and Figure 3-19 are presented as estimating drawdown in surface water bodies, monitoring wells, and residential wells after pumping 180 days with no recharge. However, the tables, graphs, and figures depict the actual observed water level measured

prior to, and during, the withdrawal test with the addition of high recharge conditions that occurred prior to and during withdrawal testing. Therefore the extrapolation of drawdown data after 180 days of pumping using this data include the effects of recharge that occurred during the withdrawal testing program; consequently the actual drawdowns and associated impacts would be greater than presented in the application. Because adjusting for other hydraulic influences is generally essential for completing an accurate adverse impact assessment, the effect of recharge during the withdrawal must be "calibrated out" of the model, as required by Env-Ws 388.09(a), Env-Ws 388.14, Env-Ws 388.09(h), and Env-Ws 389.11(c), in order to present a valid impact assessment. Env-Ws 388.09(h) and Env-Ws 389.11(c) reference the pumping test requirements contained in Env-Ws 379.11.

The report indicates that 1.79 inches of precipitation fell in the three days immediately prior to the test. Although some of the precipitation fell as snow and was not immediately available as recharge, melting during the test probably allowed significant infiltration of water into the ground. An additional 0.55 inches of precipitation fell during the 10-day test. Specific examples of possible impacts caused by precipitation follow:

- The drawdown graphs in Appendix H which show water level increases in a number of on-site wells between 5000 and 6000 minutes after pumping began; and
- Water levels in off-site wells that were not apparently impacted by pumping generally showed a rise in water levels before and during the pumping test.
- An example of where precipitation may have masked pumping-induced drawdown may be the New Barn Well (NBW). The report (page 28) predicted no response at the NBW, even though Geosphere's 2001 short-term step tests indicated there was a response. The report's results for the NBW show no response due to pumping, as depicted on the arithmetic-scale graph of transducer data (Appendix H), but the vertical scale is not suitable and may have hidden a response. The semi-log plots for both manual and transducer data show apparent responses to both precipitation and pumping shutdown in the NBW.

In addition to not correcting for the groundwater and surface water level elevations for the effects of precipitation, the application did not qualitatively or quantitatively describe the impacts associated with discharge pipe leakage that may have affected water level measurements obtained from P-3S, P-3D, PS-3S, PS-3D, P-2S, P-2D and P-2S. The application also did not describe or correct for the constantly changing weather conditions that occurred prior to, and during, the withdrawal test to reflect the 180-day no recharge requirement of Env-Ws 388 or 389: Temperature data and weather conditions were not provided in the application as required by Env-Ws 379.11(e)5, 7 and 8 by references contained in Env-Ws 388.09(g) and 389.11(c). The period immediately prior to and during the withdrawal test were dominated by constantly changing and very contrasting weather conditions that included rain, snowfall, warm weather causing significant snow melt, and periods of below freezing temperatures causing surface water bodies to freeze. The occurrence of each of these climatic conditions can significantly affect water level measurements and therefore impact the interpretations or analysis completed using this data.

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 and Env-Ws 389.19 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20(a); and 2) Not assessed accurately to the extent that it can be demonstrated that the

withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

As described in findings pertaining to comments 1, 2, and above; and in findings contained in Section 4.0 of this decision, USA Springs submitted supplemental information after the Department's August 12, 2003 letter that: 1) Corrects for precipitation; and 2) Proposes comprehensive monitoring and reporting programs to assess impacts to water users and water resources. Accordingly, the application now meets the requirements of Env-Ws 388.

7) *Presentation of Raw and Processed Data from Withdrawal Testing: The application does not contain raw data associated with the analyses contained in the report. Env-Ws 379.11(e)(8), which is referenced by Env-Ws 388.09(g) and Env-Ws 389.11(c), requires that water level data be presented in tabular form and describes the types of withdrawal testing data to be presented. This regulation requires that appropriate corrections for other hydraulic influences on water elevations be made. Both recorded and corrected water levels are to be plotted versus time, as spelled out in detail in Env-Ws 379.11(e)(8)c. Standard industry practice is to provide both the raw and processed data for many reasons including:*

- a) Identifying any raw data that has been modified during the processing of the data for graphing purposes.*
- b) Identifying where there are discrepancies between measurements that were collected using automated devices such as transducers/data loggers versus those that were collected manually at the same monitoring location. For instance, in the water level graphs presented in Appendix H, some manual water level measurements appear inconsistent with the measurements collected by the pressure transducer (see graphs for PS-2S, PS-4S, PS-8S for examples), but this would be more easily assessed if actual water level measurements and associated dates and times could be compared.*
- c) Identifying which raw data was intentionally omitted or adjusted from graphs due to equipment malfunctions or drift in instrument calibration. For instance, DES observed in the field that the measurements in the transducers did not always reset to original baseline conditions when removed from, and placed back into, wells for daily inspection. While this is a common occurrence with these devices for which data corrections are appropriate, the methodology for correcting the measures should be explained and fully justified.*
- d) Presenting information that confirms the frequency of measurements, including actual date and time to further authenticate and validate data collected in the report.*
- e) Providing raw data for the record in the event a proposed project is approved and begins operating, but it is later determined that additional data analyses is required by DES or applicant to assess a changed or unanticipated condition.*

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 and Env-Ws 389.19 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20; and 2) Not assessed accurately to the extent that it can be demonstrated that the

withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

USA Springs provided the Department a CD-ROM with all of the information described above in its September 11, 2003 submittal. The application now complies with the requirements of Env-Ws 388.

- 8) *Delineation of the Zone of Influence: The application does not provide a clear basis for delineating the extent of the zone of influence shown in Figure 3-13 relative to all orientations of the site and the network of wells monitored during the withdrawal test. The network of wells did not extend in the northern, western, or southern direction of the site to a distance where no response to pumping was observed. The application does not provide a technical justification for estimating the extent of the zone of influence (or "cone of depression") to compensate for the lack of monitoring points in these directions. The delineation of a zone of influence is required by Env-Ws 388.14 and Env-Ws 388.06(i)(3)a, and is a necessary activity to determine which water users and resources, identified in accordance with Env-Ws 388.15, may be adversely impacted as described by Env-Ws 388. The delineation of the zone of influence is also a partial basis for the delineation of the wellhead protection area required by Env-Ws 389.15.*

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 and Env-Ws 389.19 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20; and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

USA Springs responded to this comment as item 5 in its August 12, 2003 submittal and as item 8 in its September 11, 2003 submittal. The application now meets the requirements of Env-Ws 388.

- 9) *Accuracy of Measurement of Withdrawal Testing Discharge Measurements: The withdrawal test used flow meters instead of orifice weirs, and the calibration certification for the meters had expired prior to the date of the withdrawal test (Appendix H.9). Env-Ws 379.11(e)(2)c, which is referenced by Env-Ws 388.09(g) and Env-Ws 389.11(c), stipulates that "the discharge rate from the test well shall be measured using a circular orifice weir or other device which provides measurements of equal precision." When flow meters are used, it is common practice to provide a secondary method to measure discharge rates at some point in the discharge line and/or to use orifice weirs to verify the accuracy of the flow meters. Appendix H.9 contains a letter describing the accuracy of the water meter used in the mobile treatment unit (a potential secondary measurement opportunity), but the report does not contain any flow recordings for this meter. Assuming that quantity of water pumped is tied to the degree of impact on domestic wells, wetlands and contamination migration, confidence in the precision of the discharge measurements is critical to establish a technically sound basis for a permitted production volume in accordance with Env-Ws 388.24 and Env-Ws 389.12, for ensuring that the withdrawal test estimated the effect of the proposed withdrawal under maximum production volume criteria as required by 388.09(a), and to ensure compliance with Env-Ws 388.09(e) which states a permitted production cannot exceed the production volume demonstrated during the withdrawal test. Having confidence in the measured discharge rate is important in the event a permit is issued with an ongoing monitoring, reporting and mitigation program in accordance with Env-Ws 388.20-388.21.*

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 and Env-Ws 389.19 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20; and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

USA Springs provided additional documentation on August 12, 2003 demonstrating that the meters used to measure the withdrawal rates of the wells during the withdrawal test were accurate and met the requirements of Env-Ws 388.

10) *Stability of Discharge Rate During Withdrawal Testing: Env-Ws 379.11(e)(2)e (referenced by Env-Ws 388.09(g) and Env-Ws 389.11(c)) requires that the "test well shall be pumped at a single, constant rate", but does not specify a tolerance limit. After installing the new meter on USA-1 on 11/22/02, no interruptions were recorded, and all three wells had constant "target rates" for the rest of the test. However, significant (>10%) fluctuations relative to the target rates are noted in Appendix H.1. Presentation of average pumping rates (and deviations) for each well for the last 7 days of the test are necessary, as is discussion of the effects of the discharge deviations on the key interpretations for the analysis relative to the requirements of Env-Ws 388 and 389. Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 and Env-Ws 389.19 is not complete and correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20.*

USA Springs presented the average and standard deviation of the pumping rates for the last seven days of pumping in its August 12, 2003 submittal. The permitted production volumes for each of the wells is equivalent to the average production rate. Data submitted by USA Springs demonstrates constant monitoring and adjustments of the pumping wells to maintain the target flow rates. The withdrawal rates for each of the wells never consistently trended upward or downward and thus the variations in the withdrawal rates over the seven days of the withdrawal test do not impact the ability to assess impacts to water resources or water users. Therefore, the Department now finds that information submitted by USA Springs regarding the pumping rates meets the requirements of Env-Ws 388.

11) *Water Quality Sampling Documentation: Env-Ws 389.11(f) and Env-Ws 388.09(i) require that all procedures for collecting water quality samples from the monitoring and residential wells be provided. Typically, this information includes a description of equipment and methods used to purge and collect water samples, calibration logs of all field monitoring equipment, volume of water purged from each monitoring well, water level measurements before and after the sampling event, and the data describing the water quality parameters and water level measurements that were obtained during the sampling and the purging of water from each monitoring well. This information is not included in the application. Sample collection techniques can significantly affect the concentrations of volatile organic contaminants in a groundwater sample from a given monitoring point, and this data must be included to determine if the data is of sufficient quality and to assess water quality sampling results relative to multiple sampling events or from one monitoring point to another during a given sampling event. Chain-of-custody forms must also accompany all laboratory reports to ensure that the sample was properly preserved, stored, and transported to the laboratory. These forms were not included in the application. The chain-of-custody forms also provide the names and signatures of the individuals responsible for the sample collection, storage, and laboratory processes. Accordingly, DES finds that the information in the report produced in accordance with Env-Ws*

drawdown may impact the functions and values of wetlands as required by Env-Ws 388.16 using the criteria for impacts to water resources specified in Env-Ws 388.18(c)(6) and (7) or propose detailed monitoring, reporting, or mitigation plans in accordance with Env-Ws 388.20 – 388.21 for representative water resources identified in Env-Ws 388.09(d) as required by Env-Ws 388.20(a) and (b) (emphasis added). It is also unclear if the conclusion on page iv applies to all representative water resources potentially impacted by the withdrawal as described in finding 13 above, or if it applies only to select areas that were monitored during withdrawal testing.

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

USA Springs submitted a detailed monitoring, reporting, and mitigation program in accordance with the requirements of Env-Ws 388.20 – 388.21 for representative water resources identified in Env-Ws 388.09(d) as required by Env-Ws 388.20(a) and (b) in its August 12, 2003 and September 11, 2003 submittals. The monitoring, reporting, and mitigation plans submitted by USA Springs now ensures that that representative water users and resources will be assessed on an ongoing basis and the information made available to all interested stakeholders. The mitigation plans will prevent impacts from becoming adverse and ensures all adverse impacts will be mitigated. This is also discussed in Section 4.1 of this document.

15) Water Level Data Presentation and Wetland Impact Assessment: Typically during a withdrawal test, if a groundwater withdrawal is deriving water from wetlands, drawdowns on the order of 0.1 feet are observed in wetland monitoring points. The water level data presented in the report plot water levels on a graph with water level elevation or drawdown shown on the y-axis. However, the y-axis has a range that exceeds the actual fluctuation of water levels by one or two orders of magnitude, making it very difficult and in some cases impossible to determine if a shallow well responded to the pumping of the wells at USA Springs. Therefore it cannot be determined if the proposed withdrawal may cause fluctuations in surface and groundwater elevations that are potentially significant (see graphs for DP-1S(in), DP-1S(out), DP-2S, PS-1S, PS-2S, PS-4D, PS-5S, PS-5D, PS-6S, and PS-7S as partial examples in Appendix H of the application). Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

USA Springs provided the Department with a CD-ROM in its August 12, 2003 submittal that contains computer files of the data and graphs so that the scale of the graphs can be customized and changed as required to review the data. Accordingly, the Department finds that the data submitted by USA Springs can be assessed accurately and in accordance with the requirements of Env-Ws 388.

16) Effects of Precipitation Data on Data Obtained from the Withdrawal Test on the Wetland Impact Assessment: As described in Finding 6 above, rain, snow, temperature fluctuations, and discharge pipe leakage may have an effect on water levels during the withdrawal test. Measurements obtained

from monitoring points located in the shallow overburden and surface water bodies also appear to be impacted by weather trends (see water level elevations measured during the antecedent and pumping periods for OW-1, DP-1S, PS-2S, PS-3S, PS-4S, PS-8S, PS-9S, P-1S, P-1D, P-2S, P-2D, P-3S, P-4S, P-4D, P-5S, P-5D, P-6S, P-6D, P-8S, P-8D, P-9S, and P-9D).

Env-Ws 388.20(a)(1) describes the need to conduct ongoing monitoring upon operating a withdrawal when withdrawal testing data are not sufficient to verify that adverse impacts from a large withdrawal will not occur. Although the withdrawal test included a substantial number of monitoring points, many of the responses observed from shallow overburden and surface water monitoring locations were dominated by very high precipitation and highly variable climatic conditions. These influences caused the water level in the shallow monitoring wells to rise an order of magnitude higher than the typical range of drawdown that is caused by a ten day withdrawal test. This means that even if corrections for precipitation are applied, that much of the environmental monitoring data collected during the withdrawal testing program will be ambiguous.

The application does not contain a monitoring, reporting, and mitigation program prepared in accordance with Env-Ws 388.20 and 388.21 to compensate for insufficient and incomplete data that exists to complete an adverse impact assessment in accordance with Env-Ws 388.20 as allowed by Env-Ws 388.20(a)(1). The monitoring, reporting, and mitigation program presented in Section 4.2.3 of the report is very limited in scope, and only monitors the prime wetland immediately adjacent to the site. A comprehensive monitoring, reporting, and mitigation plan must be developed and implemented that protects the functions and values for all wetlands within a zone of influence that is delineated in accordance with Env-Ws 388.09(a), Env-Ws 388.06(h) or Env-Ws 379.11(e)(8) in order to ensure that adverse impacts as defined by Env-Ws 388.18(c)(6) and (7) do not occur (emphasis added).

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

On September 11, 2003, USA Springs submitted a comprehensive monitoring, reporting, and mitigation program that meets the requirements of Env-Ws 388 as described in Section 4.1.3, Comments 1, 2, and 3 above, and Section 6.3, above.

- 17) *Impact Assessment to the On-Site Beaver Pond and Other Wetlands: The report includes the statement that "potential loss in groundwater discharge to the on-site Beaver Pond (BPW40) is insignificant compared to the storage in the Pond and the flow rate observed in the Unnamed Creek during the test" (page 38). The report's wetland leakage analysis estimates the amount of upward flow from shallow overburden to the wetland under non-pumping conditions, and it also estimates the amount of downward flow from the wetlands to shallow overburden after 180 days of pumping with no recharge. The report's analysis then combines these two results to obtain the "total difference in leakage" (Table 4-2) of 0.16 cu. ft./min.*

The report presents limited data characterizing the geologic deposits beneath BPW40. The drilling and boring logs in Appendix E contain geologic information for one point (DP-1) in BPW 40. This log indicates only that 4 feet of muck (loose, wet, brown, suspended fine organic material with sticks) is underlain by 3.5 feet of "wetland deposits" that were not sampled or described. With this limited

information, the magnitude of leakage that would occur in response to head differences between the wetlands and the shallow overburden cannot be accurately predicted. The application omits and provides no discussion regarding the following:

- a) How unknown variations in the thickness of sediments underlying the wetland were accounted for in the analysis;*
- b) How the heterogeneity and occurrence of preferential pathways in the sediments underlying the wetlands were accounted for in the analysis;*
- c) How the method for estimating the hydraulic conductivity of the sediments underlying the beaver pond was correlated with the physical properties of the actual sediments. The vertical hydraulic conductivity value used in the calculations is taken from a single triaxial permeability test on a sample collected from OW-1D, located outside of wetlands and more than 1000 feet away from BPW40. The report acknowledges (page 39) the discrepancy, but states that the vertical permeability result "is conservative because the fine-grained, organic-rich wetland/pond deposits are expected to have a lower vertical conductivity";*
- d) Why the water levels used to estimate vertical gradient were not corrected to adjust for recharge from precipitation that occurred immediately prior to and during the withdrawal test;*
- e) Whether the results of water level monitoring at DP-1S may suggest that the beaver pond acts as a boundary condition, given that the water level in the shallow subsurface equilibrates with the water level of the beaver pond during withdrawal testing;*
- f) Why the leakage analysis was limited to only 50,000 ft² of the pond bottom given that:*
 - i) The zone of influence of analysis did not correct for precipitation that occurred prior to or during the withdrawal test;*
 - ii) The water level monitoring network consisted of driven monitoring points in and around the wetland. Therefore, the soils underlying the adjacent prime wetlands (BPW40) were not directly characterized so the vertical placement of the piezometer screens does not have a well-supported technical basis; and*
 - iii) The pond may act as a hydraulic boundary to the underlying aquifers.*
- g) Why the wetlands leakage analysis and water budget (pages 38–40 and Table 4-2) was not corrected to dry weather conditions from the relatively high flows and surface water levels that existed during the withdrawal test. The data presented in page 40 of the report supports USA Springs' observation that there was no response noted in overburden deposits near Nottingham Critical Wetlands (CI)/Barrington Prime Wetlands #39 and Barrington Prime Wetlands #10, but the effects of precipitation on the data are not considered. This conclusion is logically extended to "far-field wetlands located within the Study Area." Also, the report extends the observations for these two wetlands to make the conclusion that "there will be no adverse impacts to any far-field wetlands located within the Study Area." Similarly, the potential impacts to these wetlands need are not assessed for dry conditions for those wetlands that may overlie certain bedrock fracture zones (and thus experience preferential drawdowns). Also, PS-2S, located near a small*

wetland near pumping well USA-2, showed a slight response (rise in water level) at the time of pumping shutdown that is not considered in the application(see graph in Appendix H).

The application must either contain the information listed above, or (emphasis added) **an impact monitoring and reporting program in accordance with Env-Ws 388.20 to address these data gaps** (emphasis added). The application contains neither. Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

and

18) *Impacts to On-site Beaver Pond During Low Flow Conditions:* On page 40 of the report, it is concluded that "both the large flow volume in the Unnamed Creek and the large storage of the pond are expected to minimize any potential effect of the proposed withdrawal on the wetland system and pond." The conclusion that pond storage will help minimize pumping effects implies that USA Springs believes that infiltration of water from the pond may occur during pumping. The report does not discuss the effect that pumping the wells during a time of reduced (or even zero) flows in the Unnamed Creek would have on the amount of water in the pond. If stream flow were reduced or eliminated, and if groundwater discharge to the wetland ceased, the pond would lose storage due to evaporation, surface water outflow, and possible infiltration into the ground under pumping stress. These potential wetland effects are not assessed in the application. The water budget also does not incorporate the loss of water to evapotranspiration, as well as the issues described in Finding 17, above.

The application must either contain the information listed above, or an impact monitoring and reporting program in accordance with Env-Ws 388.20 to address these data gaps (emphasis added). The application contains neither. Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

USA Springs has adequately responded to this comment on September 11, 2003. USA Springs submitted a comprehensive monitoring, reporting, and mitigation program that meets the requirements of Env-Ws 388 as described in Section 4.1, above; comments 1, 2, and 3 above; and throughout Section 5.0 of this document.

19) *Miscellaneous Omissions in the Application Relative to Wetland Assessment:* Appendix D of the application contains the following omissions or information that is provided has not been updated from the preliminary application to reflect information contained in other sections of the application:

- a) Table 1 which is referenced on page 1, paragraph 2, but is not included in the appendix;
- b) A revision of this section to reflect the zone of influence that was delineated in accordance with the requirements of Env-Ws 388.09(a), Env-Ws 388.06, Env-Ws 388.14 and Env-Ws 379.11(e)(8);
- c) A figure showing the location of onsite wetlands that are described in Attachment C; and

- d) *An explanation of how the requirements of Env-Ws 388.09(d) which requires the monitoring of representative wetlands were complied with.*

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

USA Springs provided items described by subparagraph a, b and d in Items 13 of its submittal on August 12, 2003 and Items 13 and 14 in its submittal on September 11, 2003. In its August 12, 2003 submittal, USA Springs referenced maps depicting onsite wetland already on file with the Department in response the Department's comment in subparagraph (c). The Department finds that USA Springs has complied with the requirements of Env-Ws 388 by submitting this supplemental information.

- 20) *Private Well Adverse Impact Assessment: The application states that the pumping of the three wells may dewater the water column in private wells by a factor of only 10% (page 35). However, this much dewatering may result in the dewatering of a primary water bearing fracture that supplies water to the well, and, as a result an adverse impact in accordance with Env-Ws 388.18(c) could occur. This means an alternative water supply may have to be provided to these water users. The application does not contain a mitigation program in accordance with Env-Ws 388.21(a)(1) as required by Env-Ws 388.17(c) (emphasis added).*

Projected 180-day drawdown results (Table 4-1) show that four of the domestic wells monitored would experience a drawdown greater than or equal to 10% of the available water column under high recharge conditions. All of these wells (Brett and Stephanie Gillespie, Irene Gillespie, James Page, Jr. and John Pierce) are located along Rt. 4 (Old Turnpike Road), west of the USA Springs site (Figure 3-13). The Brett and Stephanie Gillespie well has a projected drawdown of 61 feet, and the Page well shows a projected drawdown of 39 feet and is more than 3000 feet away from the nearest USA Springs pumping well. Additional wells in this vicinity have projected drawdowns that are greater than 5% of the water column. Of the four wells with greater than 10% projected drawdown, none has a Well Completion Report in Appendix C, and Appendix C contains a questionnaire only for the Pierce well. This questionnaire indicates that a new pump motor was installed in March 2002, but does not provide pump depth or other information. The application asserts (page 35) that "anticipated depth of pump intakes (is) expected to be ... at sixty to seventy-five percent of the well depth", but provides no evidence. The report predicts "no loss of available water to the users of these wells." Based on the data presented in the application, this assertion has not been justified.

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

and

- 21) *Private Well Adverse Impact Assessment and Mitigation: The application indicates that pump intakes of private wells will be lowered (page 35) to mitigate an impact. However, this mitigation measure may not be adequate to prevent an adverse impact from occurring in accordance with Env-Ws 388.18(c) as required by Env-Ws 388.23(b)(2). Loss in hydraulic head within the water column*

USA Springs provided the Department with an explanation in item 5.1 of its August 12, 2003 submittal. By submitting the supplemental information described above, the Department finds that USA Springs has complied with the requirements of Env-Ws 388.

- 24) *Public Notification: The Study Area delineated pursuant to Env-Ws 388.06 and 388.14 in Figure 3-1 and described in the report on page 7, paragraph 4, includes the Town of Northwood and a public water system in Barrington, in addition to the Town of Nottingham and Barrington which were included in the original study area delineation. It is DES's understanding that the Town of Northwood and the public water system at the Barrington Home Estates have not received notification in accordance with RSA 485-C:14.*

Accordingly DES finds that the information in the report produced in accordance with Env-Ws 388.17 is not complete and correct as required by Env-Ws 388.23(b)(1).

This comment pertained to USA Springs' first large groundwater withdrawal application. USA Springs complied with the public notification requirements of RSA 485-C:14 for its current large groundwater withdrawal application.

- 25) *Demonstration of Need/Water Efficiency: RSA 485-C and Env-Ws 388.05 require that an applicant demonstrate a need for a proposed withdrawal. The report requests a permitted withdrawal volume that appears to exceed the volume of water that can be trucked off-site based upon local zoning (see letter and attached affidavit from Town of Nottingham to DES dated March 14, 2003). The report does not address local zoning restrictions on trucking, but rather points to the consumer demand for bottled water as a basis of need. State law (RSA 485-C:4, XII, b) relates the "Demonstration of Need" specifically to implementing water conservation techniques when developing a new large groundwater withdrawal. A permit cannot be issued for a withdrawal volume for the amount of water that exceeds the amount the applicant has demonstrated a need for while implementing water conservation measures, as this would allow for the inefficient use of water.*

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is not complete and correct as required by Env-Ws 388.23(b)(1).

When the Nottingham Zoning Board of Adjustment approved the use of the USA Springs' property for a water bottling facility in an area zoned as rural residential, it established a condition that the number of trucks allowed to enter the site each day would be limited to 60. USA Springs submitted detailed calculations on September 11, 2003 demonstrating that the requested withdrawal amount can be shipped off-site in less than 60 trucks. Nottingham submitted comments on May 21, 2004 which included an affidavit previously submitted from the professional engineer specializing in transportation stating that USA Springs may only ship 242,550 gallons of water per day in 20 ounce (oz.) bottles based upon the 60 truck zoning limit. Nottingham's engineer assumed that 55 trucks per day would be available to truck bottled water and that the remaining five trucks would be associated with other supplies or services required to operate the bottling plant. Also, Nottingham's engineer stated that it is standard industry practice to ship 28 pallets containing 42 cases of bottled water. Nottingham also assumed that each case contained twenty-four, 20 oz. bottles of water. Nottingham commented that USA Springs presents just an arithmetic calculation for how much water may be shipped based on trucking weight limitations and ignores the reality of trucking and packaging practices.

The Department finds that Nottingham's comments, while not unreasonable, do not prove that USA Springs cannot ship 307,500 gallons from the site daily. First, on some days, USA Springs will likely be able to utilize all sixty of its allotted truck trips to ship water off-site. Secondly, the Department did complete a brief internet search on this topic and found that some trucking and pallet configurations could permit USA Springs to transport up to 324,000 gallons of water off-site in 20 oz bottles. Furthermore, USA Springs is required to implement water conservation practices as described in Section 4.2, above. These requirements ensures no more water is extracted than what is needed by USA Springs to conduct its business.

The Department finds that USA Springs and the large groundwater withdrawal permit submitted by the Department has complied with the requirements of Env-Ws 388 by submitting the supplemental information described above.

- 26) *Monitoring and Reporting Program: On page 41 of the report, it is explained that the objective of the proposed future monitoring and reporting program is to: "1) Confirm the conclusions reached on the basis of the withdrawal test; 2) Ensure that the operation of the proposed withdrawal does not have any adverse impacts on current water users or wetlands; and 3) Collect data needed to make necessary operational changes." An additional objective of the future monitoring and reporting program must be to address the condition described by Env-Ws 388.20(a)(1). This regulation describes the need to conduct ongoing monitoring upon operating a withdrawal when withdrawal testing data is not sufficient to verify that adverse impacts from a large withdrawal will not occur (emphasis added). Although the withdrawal test included a substantial number of monitoring points, much of the response observed from shallow overburden and surface water monitoring locations was dominated by very high precipitation and highly variable climatic conditions. These influences caused the water level in the shallow monitoring wells to rise at an order of magnitude higher than the typical range of drawdown that is caused by a ten-day withdrawal test. This means that even if corrections for precipitation were applied to the data and analysis in the application, much of the wetland environmental monitoring data would likely remain ambiguous and require ongoing monitoring in accordance with Env-Ws 388.20 (emphasis added).*

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

As described in comments 2, 3, 14, 17, 20, and 22 above, USA Springs' August 12, 2003 and September 11, 2003 submittals meets the requirements of Env-Ws 388.

5.10 Conditional Permits

Both the Town of Barrington and Nottingham have provided comments stating that the Department may not issue conditional approval for large groundwater withdrawal permits. Their comments state that the Department does not have a legal authority to issue large groundwater permits with conditions and that the Department made such findings in its December 11, 2003 Final Decision on the first large groundwater withdrawal application.

d. The Strafford Region and Town of North

The Department made the following comments as discussed in Section 5.11:

Issuing a large groundwater withdrawal permit does not set aside the need to develop a withdrawal plan for the withdrawal large volume groundwater. If it has not withdrawn groundwater, Ws 388.18(c)(4) and (5) require the applicant to develop a withdrawal plan.

The Department routinely reviews groundwater withdrawal permits for golf courses and bottled water (where the wells are located in cases) while other agricultural withdrawals (Ws 388.21(a)(1) allow a withdrawal permit, and does not require a mitigation plan.

Activities may change over time. Nottingham. Issues 1 and 2 of Ws 389 requires that a withdrawal permit be approved more than 90 days of approval of a new source of bottled water is a condition approved in accordance with the Department's Geographic Information System source water protection plan. Executive Order 2004-01 (case) must be notified.

5.11 Arsenic

The public has submitted a withdrawal permit for the bedrock aquifer in the area of increase oxygen via oxidation of arsenic. Wisconsin also has a withdrawal permit for the aquifer at the USA Springs

On all previous large groundwater withdrawal permits, conditions to the permit have been set forth in the permit:

- 1) Address minor deficiencies that can be controlled and mitigated by clearly prescribed measures by applicant; and/or
- 2) Require a detailed response plan tied to specific standards which are necessary to ensure the withdrawal remains in compliance with the regulatory requirements under varying conditions of use.

Conditional approvals are a standard feature of most approvals issued by any regulatory agency administered by the Department. In December 2003, the Department denied a large groundwater withdrawal permit to USA Springs based on its first application due to the existence of a contamination source. In its first application, USA Springs proposed to contain contamination in the overburden and bedrock aquifer with remediation wells upgradient and adjacent to its site. USA Springs pumped its large groundwater withdrawal for bottled water. The Department found that this approach was not plausible, and that USA Springs submitted no information justifying that this would be possible. In its second large groundwater withdrawal application, USA Springs proposed the same approach but with data collection to demonstrate the feasibility of containment. The Department expressed serious concerns with this approach. In a letter dated March 10, 2004, USA Springs modified its approach and requested a large groundwater withdrawal permit with the condition that large groundwater withdrawals could not occur at the site until all groundwater contamination associated with the Harnum property (now Just Cause Site) is remediated to concentrations consistent with ambient groundwater quality standards. Instead of USA Springs having to demonstrate that contamination is contained by remediation wells while USA Springs' wells are pumping, USA Springs has to demonstrate that contamination has been reduced below AGQS before USA Springs can be used.

Barrington and Nottingham have offered similar comments regarding the Department's denial of a large groundwater withdrawal permit. Nottingham states in its May 21, 2004 letter that the Department's large groundwater withdrawal permit to USA Springs conditioned on AGQS is not allowable under the following detailed comments:

4. Recommend that the Department reaffirm its finding that it would be inconsistent with the state laws (RSA 481:1 and RSA 485-C:1) and its regulations ENV-Ws 388 to condition a large groundwater withdrawal permit conditional upon the achievement of ambient groundwater quality standards. This position is supported by the following facts.

- a. The groundwater is a public resource which cannot be set aside for future private use. The Department requires that issuance of large groundwater withdrawal permits must be based on current groundwater testing data at the time the withdrawal is to begin.
- b. The regulations do not anticipate granting a withdrawal permit which would be exercised at an uncertain time in the future.

c. Because it is uncertain when AGQS will be achieved, it is clear that development activities surrounding the Source Water Protection Area will change before AGQS are achieved.

The Department finds that: 1) There is no basis for believing arsenic concentrations will increase in the groundwater when USA Springs initiates its large groundwater withdrawals; 2) Data exists that demonstrates that, in New Hampshire's typical hydrogeologic conditions, arsenic concentrations in the bedrock aquifer will not increase when withdrawals at USA Springs initiated; 3) Arsenic is almost not detectable (non detect to 0.002 mg/l) in water derived from the bedrock aquifer from which USA Springs will withdraw water. The standard for arsenic in New Hampshire is 0.01 mg/l; and 4) As a bottled water source, USA Springs will have to complete routine sampling of all its sources of water for arsenic as well as other constituents regulated by the Safe Drinking Water Act.

There are over a thousand public water systems in New Hampshire that have sampled water historically to ensure compliance with water quality standards regulated by the Safe Drinking Water Act (which includes arsenic). Most of these public water systems have operated for over a decade and therefore water quality monitoring has occurred for years. The United States Geologic Survey NH-VT office has been researching the occurrence of arsenic in the groundwater in New Hampshire for the last several years. Neither the State's long-term water quality monitoring data or any reports studying the occurrence of arsenic in groundwater in New Hampshire suggest that the concentration of arsenic in the groundwater has increased due to the pumping wells.

The water derived from USA Springs wells exhibit very low arsenic (less than 0.002 mg/l) and sulfate concentrations (9.9-12 mg/l). The arsenic concentration in the Wisconsin case study exhibited 23-166 mg/l of arsenic and 223 to 618 mg/l of sulfate. The Wisconsin case study focused on a sandstone layered sedimentary aquifer with a secondary sulfide bearing cement horizon with arsenic concentrations at levels not known to exist in New Hampshire's drinking water supplies. Neither the arsenic level nor the sedimentary aquifer type exists beneath the USA Springs site.

USA Springs will be required to complete routine monitoring of its water quality for arsenic. This data will document the quality of water derived from the aquifer over time. Because there is a minimal amount of arsenic and sulfate detected in the groundwater, there is no reason to believe that the proposed groundwater withdrawal will cause arsenic to exceed regulatory standards.

5.12 *Mercury Deposition in the Watershed*

The public has submitted comments stating that the groundwater withdrawal at USA Springs will increase the concentration of mercury in Mendums Pond because the flushing rate of the pond will be reduced. According to a report titled Mendums Pond Diagnostic/Feasibility Study completed by the Department in 1992, the pond has a volume of 1.7 billion gallons of water and an annual flushing rate of 1.43. If USA Springs withdrew the maximum amount of water daily as approved by the permit, every day of the year, it would extract 0.1 billion gallons per year. This would reduce the annual flushing rate of Mendums pond from 1.43 to 1.37. This estimate is conservative because it assumes that all groundwater flow in the deep bedrock aquifer is within watershed boundaries and discharged to the surface before or into Mendums Pond, and that USA Springs will be pumping the maximum volume of water every day. The Department accordingly finds that USA Springs will have a negligible effect on the flushing rate of Mendums Pond. Consequently, mercury concentrations in the pond are not expected to change due to the proposed large groundwater withdrawal.

5.13 Contamination Sites in the Region Other than the Harnum Site

The public has stated that it is concerned that the USA Springs large groundwater withdrawal would impact other documented contamination sites such as Northwood Ridge, Harding Metals, Lee Traffic Circle and the Tibbets Road site.

The Lee Traffic Circle is located five miles away, hydrologically downgradient of the USA Springs site. The Tibbets Road site is located over three miles away and hydrologically downgradient of the USA Springs site. Both sites are outside the study area delineated for the proposed large groundwater withdrawal pursuant to Env-Ws 388.06(i) and (j). Also, the elevation of the full lake water level in Mendums Pond is 225 feet mean sea level. The water level elevation in bedrock wells monitored near the USA Springs pumping wells after pumping 180-days with no recharge to groundwater is estimated to be 340 to 380 feet mean sea level. Conditions in the permit ensure excessive dewatering of the aquifer will not occur and the water level in the aquifer will always be at least 100 feet above the elevation of the land surface elevation of these two contamination sites. Consequently, the flow of contamination at these sites will not be altered.

The Harding Metals site is located 2.5 miles upgradient of the USA Springs site. Northwood Ridge is located more than 4 miles upgradient of the USA Springs site. Both sites are outside the study area delineated for the proposed large groundwater withdrawal pursuant to Env-Ws 388.06(i) and (j). The proposed large groundwater withdrawal will not alter the flow of contaminated groundwater at either of these two sites because both sites are sufficiently far away and beyond the zone of influence created by USA Spring's withdrawal. Both sites are also monitored under groundwater management permits, and water quality samples are frequently collected at both sites to assess the distribution and migration of contaminants.

5.14 Impact to Water Resources Outside the Study Area

Many public comments have stated that impacts could occur at surface water bodies throughout the Seacoast Region as a result of the large groundwater withdrawal at USA Springs. Numerous reservoirs, lakes and water supplies have been specifically mentioned. The Department finds that the no water body outside the study area delineated pursuant to Env-Ws 388 will be adversely impact for the reasons explained in Section 5.6 of this decision.

5.15 Alternative Permitting Decision Making Criteria and Statistical Testing

Some public comments have offered the Department an alternative set of decision making requirements or statistical tests other than those specified in law and rule. The Department must use the decision making criteria and permitting process described in laws and rules and cannot arbitrarily impose alternative criteria on USA Springs.

5.16 Estimated Zone of Influence by Just Cause Realty/MyKroWaters

On December 11, 2003, MyKroWaters, Inc. submitted a report titled "Combined Remedial Action Plan – Just Cause Realty Trust." This document contained analyses of remediation scenarios for the Just Cause site (also called Harnum site). Figure R1 of this document estimates the zone of influence for the proposed withdrawal. The estimate of the zone of influence for this document is not consistent with the estimated zone of influence provided by USA Springs on August 12, 2003. The zone of influence estimated by MyKroWater extends further to the east (towards Woods Road) than predicted in USA Springs in its submittal on August 12, 2003. While the Department finds that there is no data to support that groundwater levels will be impacted downgradient of the site to the extent Figure R1 predicts, two private wells on Woods Roads were required to be incorporated into the monitoring, reporting, and mitigation program to account for this discrepancy. The trigger water levels elevations for the wells on Woods Road are established in the permit based upon the anticipation that no drawdown will occur in the aquifer on Woods Road. As trigger water levels are exceeded, withdrawals from the USA Springs site will have to be reduced in accordance with the conditions of the permit.


5.17 International Trade

Several comments have been submitted to the Department regarding the impact of international trade agreements on the State of New Hampshire's authority to regulate a groundwater withdrawal under RSA 485-C if the water is sold internationally. Env-Ws 388, RSA 485-C:21, and other state law do not prohibit the sale of water internationally. The Department of Justice responded to this issue in a letter dated April 17, 2002. (Copy attached as Appendix 5). The Department adopts the Department of Justice's position on the international trade issue.

6.0 APPEALS OF THIS DECISION

Any party aggrieved by the decisions made in this document for the approval of the large groundwater withdrawal permit based on the requirements of Env-Ws 388 may appeal the decision in accordance with RSA 485-C:21, VI and RSA 541.

Date: 07 01 04

COPY

Michael P. Nolin,
Commissioner



State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

6 Hazen Drive, P.O. Box 95, Concord, NH 03302-0095
(603) 271-3503 FAX (603) 271-5171



August 12, 2003

Francesco Rotondo
USA Springs, Inc.
9 Regis Drive
Pelham, New Hampshire 03078

Subject: USA Springs – Final Application Report Dated February 4, 2003

Dear Mr. Rotondo:

The purpose of this letter is to inform you that your application for: 1) Major Groundwater Withdrawal Permit; and 2) New Source of Bottled Water has been denied in accordance with Env-Ws 388.23 and Env-Ws 389.20.

On February 4, 2003, USA Springs, Inc. (USA Springs) submitted an application report titled "Large Groundwater Withdrawal Report – Proposed USA Springs Bottling Plant" to the Department of Environmental Services (DES) in order to fulfill the requirements of New Hampshire Administrative Rules Env-Ws 388-Major Large Groundwater Withdrawal and Env-Ws 389-Groundwater Sources of Bottled Water to obtain approval to withdrawal up to 310,000 gallons of groundwater a day for the purpose of bottling water.

In a letter dated March 20, 2003, DES established the review period for the application which extended through August 12, 2003 so that supplemental information obtained from an investigation at an adjacent property pertaining to contamination may be incorporated into the application submitted by USA Springs.

In a letter dated April 11, 2003, DES provided USA Springs with preliminary technical findings on the application relative to the requirements of Env-Ws 388 and 389. In the cover letter accompanying the technical comments, DES noted that no findings pertaining to issues related to groundwater contamination and the ongoing investigation at the adjacent K&B site were provided with the preliminary findings because it anticipated that additional information regarding this matter would be forthcoming.


USA Springs has not provided supplemental information to address issues of contamination at the adjacent site, or to respond to DES's preliminary technical findings before the August 12, 2003 review period deadline. Accordingly, DES has attached decisions and findings regarding all aspects of the application, which includes only the material dated February 4, 2003. Each of the decisions and findings included with this document provide a separate and independent basis for denial of the application for a Major Groundwater Withdrawal Permit in accordance with Env-Ws 388.23 and/or a basis to deny a new source of bottled water in accordance with Env-Ws 389.20.


USA Springs may initiate a process whereby DES will provide a formal review of any supplemental information USA Springs deems necessary to satisfy the requirements of Env-Ws 388 and 389. This process may be initiated by petitioning for a rehearing in accordance with RSA 485-C:21, VI, which stipulates that any person directly affected by DES's decision may appeal and request a rehearing to DES in accordance with RSA 541. Such an appeal must be made to the DES within 30 days and must be addressed to the Administrator of the Water Supply Engineering Bureau, 6 Hazen Drive, PO Box 95,

Concord, NH 03302-0095. An anticipated timeline and activities associated with a rehearing process, if requested by USA Springs, are described below:

- 1) A request for a rehearing is submitted by USA Springs within thirty (30) days of receipt of the denial;
- 2) DES will act upon the motion within ten (10) days of receipt; and
- 3) If DES grants the motion for a rehearing, DES will allow USA Springs ten (10) days to submit any additional information it deems is necessary for DES to review. DES will establish a thirty day (30) public input period during which a public input meeting would be scheduled. USA Springs would then have ten (10) days to provide any response it deems appropriate to public comment received. DES will close the administrative record and issue a decision two weeks after the close of the administrative record.

Should you have any questions, please do not hesitate to contact the undersigned.


Sincerely,
Brandon Kernen, P.G.
Hydrologist
Water Supply Engineering Bureau


Anthony P. Giunta, P.G.
Administrator
Water Supply Engineering Bureau

Enclosure

cc: M. Sharma, Gradient Corporation
G. Smith, Esquire
R. Head, NHDOJ
S. Pillsbury, DES
H. Stewart, DES
M. Nolin, DES
C. Reilly, Town of Barrington
C. Brown, Town of Nottingham
S. Fournier, Town of Northwood
C. Copeland, Strafford Regional Planning Commission

determining if a proposed groundwater withdrawal must be approved or denied. Specifically this rule states the following:

Env-Ws 388.23-Procedure and Criteria to Issue, Deny, or Suspend a Major Withdrawal Permit

- (b) *The department shall issue or renew a major withdrawal permit described pursuant to Env-Ws 388.23 under the following circumstances:*
- (1) *When information in the report produced in accordance with Env-Ws 388.12 is complete and correct; and*
 - (2) *When the information in the report produced in accordance with Env-Ws 388.17 demonstrates the withdrawal will:*
 - a. *Not produce adverse impacts; or*
 - b. *Result in impacts that can and will be mitigated, provided:*
 1. *There is sufficient information to verify that any adverse impacts that occur as a result of the withdrawal will not be:*
 - (i) *An adverse impact that may occur immediately; and*
 - (ii) *An irreversible impact; and*
 2. *A monitoring and reporting program is implemented in accordance with Env-Ws 388.20.*
- (c) *The department shall not issue a new, or renew an existing major withdrawal permit if it is demonstrated that a withdrawal will result in adverse impacts which cannot or will not be mitigated.*

DES finds that it cannot approve the application report for new sources of bottled water because: 1) The application does not contain all of the information required by Env-Ws 389.19, and therefore must be denied in accordance with Env-Ws 389.20(c)(2); 2) The application indicates that an uncontrolled source of contamination exists in the source water protection area (which has the same meaning as "wellhead protection area") and therefore must be denied in accordance with Env-Ws 389.20(c)(1); 3) The application submitted does not contain all of the information required by Env-Ws 388.17 and consequently is not complete and correct. Therefore it does not meet the requirements of Env-Ws 388.23(b)(1); 4) The application does not contain sufficient information that demonstrates that the withdrawal will not produce adverse impacts or that these impacts will be mitigated and therefore does not meet the requirements of Env-Ws 388.23(b)(2).

Each specific component of the application or proposed project that is not consistent with the requirements of Env-Ws 388 and/or Env-Ws 389, and thus represents a separate and independent basis for denial, is listed below.

SUMMARY OF FINDINGS AND DECISIONS

- 1) *Conceptual Model - 180-day Recharge Period*: Executive Summary, page i (paragraph 1) states: "*in particular, this rate can be sustained even if there were no contribution to groundwater from precipitation at all for six months, an event which almost never occurs in New Hampshire*". In New Hampshire, water levels in all types of aquifers typically decline every year from the month of May through the month of October, because very little precipitation replenishes aquifers during this period (see data collected by the United States Geological Survey at <http://nh.water.usgs.gov/Publications/annual01/A8.gwlevels.pdf>). The rate of decline varies, being greater during periods of drought and less during wet weather periods. The application indicates 1) The no recharge condition of 180 days is overly conservative; and 2) The results of the withdrawal test reflect this condition. Neither of these assertions is correct. The no recharge condition closely represents yearly seasonal low recharge conditions and the data obtained from the withdrawal testing program and associated analyses have not been calibrated to reflect this condition as repeatedly stated in the application. Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 and Env-Ws 389.19 is: 1) Not complete or correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20(a); and 2) Not assessed accurately to demonstrate that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).
- 2) *Aquifer Storage/Source of Pumped Water*: Executive Summary, page ii (paragraph 3), page 27 (paragraph 2) states: "*Furthermore, although water available within storage will not be tapped due to the net water surplus....*". Data from the report indicates that pumped water will be derived from both "recharge" and "storage" under virtually all conditions. During some time periods, such as the wet weather period when the withdrawal test occurred, the dominant source may be recharge with less pumped from storage than during "normal" conditions. However, the report data indicate that the withdrawal test created a zone of influence (Figures 3-13, 3-16, and 3-18) and thus storage was evidently being tapped to some degree even under the November 2002 withdrawal test conditions, which were relatively wet.

Understanding the origin of water derived from a pumped well and its relationship to aquifer recharge, storage, and ultimately natural discharge is required by Env-Ws 388.06(l) and 388.14 and is fundamental element of an analysis to determine if the proposal is sustainable and will result in an adverse impact as defined by Env-Ws 388.18. It is also fundamentally important for delineating the wellhead protection area as required by Env-Ws 389.11(b) and Env-Ws 389.15. Water pumped from bedrock wells at USA Springs must either be derived from storage, increased recharge (induced infiltration of water stored in surface water bodies) caused by the pumping of the wells, and/or a decrease in natural discharge to the surface water resources. The degree that the withdrawal obtains water through one of these sources is essential for determining if an adverse impact may occur to private wells (by way of depleting storage) or water resources (by dewatering through increased recharge caused by pumping or by decreasing groundwater discharges to surface water bodies).

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 and Env-Ws 389.19 is: 1) Not complete or correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20(a); and 2) Not assessed accurately to the extent that it can be demonstrated that the

withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

- 3) *Potentially Conflicting Elements of the Conceptual Model:* The conceptual model describing the relationship between recharge in the shallow overburden and the bedrock aquifer is not reconciled with the available data, or consistently developed and integrated. The application presents two conflicting conceptual models: (1) bedrock is vertically insulated from the surficial overburden and (2) bedrock is rapidly recharged by precipitation events so groundwater is not removed from local storage (i.e., bedrock wells are closely connected to the shallow overburden aquifer). Statements that reflect the conflict within conceptual models are presented below:

Statements consistent with bedrock isolation from surficial overburden

- ?? On page 28, (paragraph 3), the report states *"minimal response was noted in the shallow overburden deposits during the withdrawal test"*.
- ?? On page 32- 33, the report suggests that bedrock is insulated and vertically distant from events that occur on the surface that might cause contamination of the bedrock aquifer.
- ?? On page 34 of the report, it is explained *"the water bearing fractures at the USA wells, especially USA-1 and 2 are at considerable depths below ground surface (ranging from 525-560 feet and 450-465 feet at USA-1 and USA-2 respectively); thus the water bearing fractures are naturally insulated (or vertically distant) from groundwater quality impacts identified in shallow overburden and the upper portion of the bedrock aquifer."*

Statements consistent with bedrock being closely connected to overburden

- ?? On page 26, the report states: *"In addition, antecedent groundwater elevation data collected for approximately 4 weeks at residential bedrock wells indicated a significant (average 2.9 feet) increase in groundwater heads. These data demonstrate that the bedrock aquifer: 1) receives significant recharge from precipitation; and 2) responds relatively quickly to recharge events."*
- ?? The report states on page 30, paragraph 3 that *"groundwater elevations at the on-site overburden piezometer/wells responded significantly (up to 7.5 feet at OW-1) and quickly in response to precipitation events during the antecedent monitoring."* OW-1 is screened in till, immediately above the bedrock aquifer.
- ?? The data presented on page 31 indicate that the observed increases in piezometric head in bedrock fractures were an order of magnitude greater than the amount of precipitation received, suggesting direct recharge to bedrock from precipitation.
- ?? Also on page 31, the report states that *"bedrock receives significant recharge from precipitation and the effect of recharge events are manifested within the bedrock aquifer (within days)"*, indicating that the bedrock aquifer is closely connected to the surface.
-

- ?? Monitoring wells NBW and OW-1 exhibited water level rises during the withdrawal test. This may suggest that precipitation directly recharges bedrock.
- ?? On page 23 of the report it is explained that "*the dip of the primary fracture (NE-SW) was almost vertical (89° degree SE) consistent with one of the conclusions of the VLF survey.*" Vertical bedrock fractures could facilitate the direct connection of the deep bedrock aquifer with the shallow bedrock aquifer and possibly the overburden.

The application presents a model whereby it depicts there being plentiful water available for groundwater development because the bedrock aquifer (source of water for the proposed well) is readily recharged by rain events, meaning that a strong connection of the ground surface and shallow overburden aquifers exist. But in sections of the application where a direct connection of the bedrock aquifer to shallow aquifers or surface water resources may present a model that could lead to the proposed withdrawal adversely impacting surface water bodies by dewatering or by altering the flow of groundwater contamination, the application presents a different model whereby the bedrock aquifer is isolated from shallow overburden aquifers and surface water bodies.

Accordingly DES finds that the information in the report produced in accordance with Env-Ws 388.17 and Env-Ws 389.19: 1) Is not complete and correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20(a); 2) Is not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2); and 3) Does not contain information demonstrating that the contamination source in the source water protection area is adequately controlled as required by Env-Ws 389.20.

- 4) *Interpretation of Water Level Measurements:* The report analysis states that deeper overburden wells show a greater response to pumping than shallower overburden wells (pages 28-29). However, there are other relationships that could develop this response. For instance, the precipitation effects on the deeper wells could be delayed relative to the shallow wells. Similarly, withdrawal test effects on the shallow overburden could be delayed relative to the deep wells. In addition to a delay affect, the report analysis may be skewed or misleading because it interprets water level measurements that have not been corrected to account for the effects of precipitation as required by 388.09(a), 388.14, 388.09(h), and Env-Ws 389.11(c). Env-Ws 388.09(h) and Env-Ws 389.11(c) reference the pumping test requirements contained in Env-Ws 379.11.

Understanding the response of the bedrock aquifer and overburden aquifers to either precipitation events or to the pumping of large withdrawals is essential for assessing the potential for impacts to existing water resources and users as required by Env-Ws 388, as well as a fundamental component of an analysis required to determine the source of recharge to pumping for the purpose of delineating a wellhead protection area in accordance with Env-Ws 389.11(b) and 389.15.

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 and Env-Ws 389.19 is: 1) Not complete or correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20(a); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

- 5) *Historic and Residential Water Quality Data:* Preliminary water quality results obtained after installing the wells and during the groundwater discharge permitting process were not included in the conceptual hydrogeologic model discussion as required by Env-Ws 388.06(c)(1). Historic data obtained from previous investigations are included in hydrogeological studies as standard practice. This data is commonly used to: 1) Verify the existing data quality; and 2) Reflect any changed conditions including an assessment of the cause of any changes. Where discrepancies exist between studies, a technical explanation needs to be provided and the data quality qualified accordingly. When information from multiple studies is consistent, more confidence is placed on the data, analysis, and recommendations contained in a given proposal.

In USA Springs' case, for example, Radium 226+228 exceeded drinking water standards set forth by Env-Ws 315.60 (which is referenced by Env-Ws 389.11(c)(3)c and 389.22) in the sampling conducted in October 2002, but is well below these standards in samples collected in November 2002. These results should be assessed to determine if groundwater derived from the pumping wells will meet drinking water standards or require treatment. Also, many of the results of water quality sampling conducted in September 2000 and October 2002 indicate that groundwater obtained from USA Springs' wells exhibit elevated concentrations of iron and manganese, and sometimes above the enforceable secondary water quality standards set forth by Env-Ws 319. The results of the water quality sampling conducted in November 2002 continue to show elevated concentrations of manganese, but this sampling event indicated that there are low concentrations of iron in the groundwater derived from USA Springs' wells. Based upon the conflicting sampling results, it is unclear if groundwater derived from USA-1, USA-2 and USA-4 will require treatment to continuously meet safe drinking water standards to meet the objectives of Env-Ws 389.11(b)(3) or (4).

Information in Section 3.4.1 of the application regarding the water quality relative to the private wells tapping the same bedrock aquifer is also not of sufficient detail to establish an understanding of baseline water quality. Due to insufficient detail in the final report and inconsistent water quality results, the baseline water quality of the bedrock aquifer is unclear. This needs to be established and documented in the application so that any changes in the water quality of groundwater derived from the bedrock aquifer can be assessed to determine if an adverse impact has occurred in accordance with Env-Ws 388.18(c)(10).

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 and Env-Ws 389.19 is not complete and correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20(a).

- 6) *Withdrawal Testing Data Processing to Incorporate the Effects of Changing Weather Conditions:* The basic purpose of the withdrawal test is to determine how the long term pumping of a proposed withdrawal will: 1) Affect the extent and nature of recharge to a multi-layer aquifer system potentially impacted by a proposed withdrawal; and 2) Impact the extent and location of natural discharge. The long term pump test should also provide an understanding of the zone of influence developed by a proposed withdrawal utilizing various analytical techniques that require aquifer water level measurements over time and production well discharge rates. This information, overlaid with an inventory of potential contamination sources and an inventory of water users and resources, is used
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In addition to not correcting for the groundwater and surface water level elevations for the effects of precipitation, the application did not qualitatively or quantitatively describe the impacts associated with discharge pipe leakage that may have affected water level measurements obtained from P-3S, P-3D, PS-3S, PS-3D, P-2S, P-2D and P-2S. The application also did not describe or correct for the constantly changing weather conditions that occurred prior to, and during, the withdrawal test to reflect the 180-day no recharge requirement of Env-Ws 388 or 389. Temperature data and weather conditions were not provided in the application as required by Env-Ws 379.11(e)5, 7 and 8 by references contained in Env-Ws 388.09(g) and 389.11(c). The period immediately prior to and during the withdrawal test were dominated by constantly changing and very contrasting weather conditions that included rain, snowfall, warm weather causing significant snow melt, and periods of below freezing temperatures causing surface water bodies to freeze. The occurrence of each of these climatic conditions can significantly affect water level measurements and therefore impact the interpretations or analysis completed using this data.

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 and Env-Ws 389.19 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20(a); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

- 7) *Presentation of Raw and Processed Data from Withdrawal Testing:* The application does not contain raw data associated with the analyses contained in the report. Env-Ws 379.11(e)(8), which is referenced by Env-Ws 388.09(g) and Env-Ws 389.11(c), requires that water level data be presented in tabular form and describes the types of withdrawal testing data to be presented. This regulation requires that appropriate corrections for other hydraulic influences on water elevations be made. Both recorded and corrected water levels are to be plotted versus time, as spelled out in detail in Env-Ws 379.11(e)(8)c. Standard industry practice is to provide both the raw and processed data for many reasons including:
- a) Identifying any raw data that has been modified during the processing of the data for graphing purposes.
 - b) Identifying where there are discrepancies between measurements that were collected using automated devices such as transducers/data loggers versus those that were collected manually at the same monitoring location. For instance, in the water level graphs presented in Appendix H, some manual water level measurements appear inconsistent with the measurements collected by the pressure transducer (see graphs for PS-2S, PS-4S, PS-8S for examples), but this would be more easily assessed if actual water level measurements and associated dates and times could be compared.
 - c) Identifying which raw data was intentionally omitted or adjusted from graphs due to equipment malfunctions or drift in instrument calibration. For instance, DES observed in the field that the measurements in the transducers did not always reset to original baseline conditions when removed from, and placed back into, wells for daily inspection. While this is a common occurrence with these devices for which data corrections are appropriate, the methodology for correcting the measures should be explained and fully justified.
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soil sampling, but the methods and rationale that were utilized to collect the soil samples were not described. Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 and Env-Ws 389.19 is not complete and correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20.

- 13) *Determination of Impacts to Representative Water Resources*: An assessment that demonstrates that representative water resources and users were monitored during the withdrawal test is not provided as required by Env-Ws 388.09(d). The identification of representative water users and resources is necessary to determine if adverse impacts as defined by Env-Ws 388.18 will occur as a result of a withdrawal. Representative water resources should be selected based upon orientation and distance from the withdrawal site, the types of values and functions supported by a water resource, well type and construction details, type of water user, and a understanding of the conceptual hydrogeological model. It is not evident from information provided in the report that such an analysis has been completed.

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20; and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

- 14) *Impact to Wetland Functions and Values*: Page iv (paragraph 6) states "*Minimal drawdown being observed in the shallow overburden deposits (on the order of 2 feet)...*". Two feet of drawdown in the shallow overburden may be significant. The lowering of shallow water by two feet may dewater submerged wetlands (including prime wetlands) or lower the water table below the root zone of wetland vegetation, thus adversely impacting natural resources and causing adverse impacts to occur as described by Env-Ws 388.18(c)(6) and (7). The application does not assess if two feet of drawdown may impact the functions and values of wetlands as required by Env-Ws 388.16 using the criteria for impacts to water resources specified in Env-Ws 388.18(c)(6) and (7) or propose detailed monitoring, reporting, or mitigation plans in accordance with Env-Ws 388.20 – 388.21 for representative water resources identified in Env-Ws 388.09(d) as required by Env-Ws 388.20(a) and (b). It is also unclear if the conclusion on page iv applies to all representative water resources potentially impacted by the withdrawal as described in finding 13 above, or if it applies only to select areas that were monitored during withdrawal testing.

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

- 15) *Water Level Data Presentation and Wetland Impact Assessment*: Typically during a withdrawal test, if a groundwater withdrawal is deriving water from wetlands, drawdowns on the order of 0.1 feet are observed in wetland monitoring points. The water level data presented in the report plot water levels on a graph with water level elevation or drawdown shown on the y-axis. However, the y-axis has a
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range that exceeds the actual fluctuation of water levels by one or two orders of magnitude, making it very difficult and in some cases impossible to determine if a shallow well responded to the pumping of the wells at USA Springs. Therefore it cannot be determined if the proposed withdrawal may cause fluctuations in surface and groundwater elevations that are potentially significant (see graphs for DP-1S(in), DP-1S(out), DP-2S, PS-1S, PS-2S, PS-4D, PS-5S, PS-5D, PS-6S, and PS-7S as partial examples in Appendix H of the application). Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

- 16) *Effects of Precipitation Data on Data Obtained from the Withdrawal Test on the Wetland Impact Assessment:* As described in Finding 6 above, rain, snow, temperature fluctuations, and discharge pipe leakage may have an effect on water levels during the withdrawal test. Measurements obtained from monitoring points located in the shallow overburden and surface water bodies also appear to be impacted by weather trends (see water level elevations measured during the antecedent and pumping periods for OW-1, DP-1S, PS-2S, PS-3S, PS-4S, PS-8S, PS-9S, P-1S, P-1D, P-2S, P-2D, P-3S, P-4S, P-4D, P-5S, P-5D, P-6S, P-6D, P-8S, P-8D, P-9S, and P-9D).

Env-Ws 388.20(a)(1) describes the need to conduct ongoing monitoring upon operating a withdrawal when withdrawal testing data are not sufficient to verify that adverse impacts from a large withdrawal will not occur. Although the withdrawal test included a substantial number of monitoring points, many of the responses observed from shallow overburden and surface water monitoring locations were dominated by very high precipitation and highly variable climatic conditions. These influences caused the water level in the shallow monitoring wells to rise an order of magnitude higher than the typical range of drawdown that is caused by a ten day withdrawal test. This means that even if corrections for precipitation are applied, that much of the environmental monitoring data collected during the withdrawal testing program will be ambiguous.

The application does not contain a monitoring, reporting, and mitigation program prepared in accordance with Env-Ws 388.20 and 388.21 to compensate for insufficient and incomplete data that exists to complete an adverse impact assessment in accordance with Env-Ws 388.20 as allowed by Env-Ws 388.20(a)(1). The monitoring, reporting, and mitigation program presented in Section 4.2.3 of the report is very limited in scope, and only monitors the prime wetland immediately adjacent to the site. A comprehensive monitoring, reporting, and mitigation plan must be developed and implemented that protects the functions and values for all wetlands within a zone of influence that is delineated in accordance with Env-Ws 388.09(a), Env-Ws 388.06(h) or Env-Ws 379.11(e)(8) in order to ensure that adverse impacts as defined by Env-Ws 388.18(c)(6) and (7) do not occur.

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

- 17) *Impact Assessment* statement that "insignificant flow from shall amount of down no recharge. The leakage" (Table

The report presents and boring logs log indicates or is underlain by information, the wetlands and the provides no dis

- a) How unknown for in the area
- b) How the head wetlands was
- c) How the monitoring pond was conducted conductivity sample collected BPW40. The permeability are expected
- d) Why the water from precipitation
- e) Whether the boundary water level
- f) Why the level
- i) The zone during
- ii) The water wetland directly well-s

range that exceeds the actual fluctuation of water levels by one or two orders of magnitude very difficult and in some cases impossible to determine if a shallow well responds of the wells at USA Springs. Therefore it cannot be determined if the proposed withdrawal cause fluctuations in surface and groundwater elevations that are potentially significant for DP-1S(in), DP-1S(out), DP-2S, PS-1S, PS-2S, PS-4D, PS-5S, PS-5D, PS-6S, and examples in Appendix H of the application). Accordingly, DES finds that the information report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that withdrawal will not produce impacts or result in impacts that can and will be mitigated Env-Ws 388.23(b)(2).

- 16) *Effects of Precipitation Data on Data Obtained from the Withdrawal Test on the Wetland Assessment:* As described in Finding 6 above, rain, snow, temperature fluctuations, pipe leakage may have an effect on water levels during the withdrawal test. Measurements from monitoring points located in the shallow overburden and surface water bodies impacted by weather trends (see water level elevations measured during the antecedent periods for OW-1, DP-1S, PS-2S, PS-3S, PS-4S, PS-8S, PS-9S, P-1S, P-1D, P-2S, P-4D, P-5S, P-5D, P-6S, P-6D, P-8S, P-8D, P-9S, and P-9D).

Env-Ws 388.20(a)(1) describes the need to conduct ongoing monitoring upon operation when withdrawal testing data are not sufficient to verify that adverse impacts from withdrawal will not occur. Although the withdrawal test included a substantial number of monitoring many of the responses observed from shallow overburden and surface water monitoring were dominated by very high precipitation and highly variable climatic conditions. caused the water level in the shallow monitoring wells to rise an order of magnitude typical range of drawdown that is caused by a ten day withdrawal test. This means corrections for precipitation are applied, that much of the environmental monitoring during the withdrawal testing program will be ambiguous.

The application does not contain a monitoring, reporting, and mitigation program in accordance with Env-Ws 388.20 and 388.21 to compensate for insufficient and incomplete exists to complete an adverse impact assessment in accordance with Env-Ws 388.20 and Env-Ws 388.20(a)(1). The monitoring, reporting, and mitigation program presented of the report is very limited in scope, and only monitors the prime wetland immediately the site. A comprehensive monitoring, reporting, and mitigation plan must be developed implemented that protects the functions and values for all wetlands within a zone delineated in accordance with Env-Ws 388.09(a), Env-Ws 388.06(h) or Env-Ws 388.18(c)(6) to ensure that adverse impacts as defined by Env-Ws 388.18(c)(6) and (7) do not occur

Accordingly, DES finds that the information in the report produced in accordance with 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not accurately to the extent that it can be demonstrated that the withdrawal will not produce result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

- iii) The pond may act as a hydraulic boundary to the underlying aquifers.
- g) Why the wetlands leakage analysis and water budget (pages 38–40 and Table 4-2) was not corrected to dry weather conditions from the relatively high flows and surface water levels that existed during the withdrawal test. The data presented in page 40 of the report supports USA Springs' observation that there was no response noted in overburden deposits near Nottingham Critical Wetlands (CI)/Barrington Prime Wetlands #39 and Barrington Prime Wetlands #10, but the effects of precipitation on the data are not considered. This conclusion is logically extended to "*far-field wetlands located within the Study Area.*" Also, the report extends the observations for these two wetlands to make the conclusion that "*there will be no adverse impacts to any far-field wetlands located within the Study Area.*" Similarly, the potential impacts to these wetlands need are not assessed for dry conditions for those wetlands that may overlie certain bedrock fracture zones (and thus experience preferential drawdowns). Also, PS-2S, located near a small wetland near pumping well USA-2, showed a slight response (rise in water level) at the time of pumping shutdown that is not considered in the application (see graph in Appendix H).

The application must either contain the information listed above, or an impact monitoring and reporting program in accordance with Env-Ws 388.20 to address these data gaps. The application contains neither. Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

- 18) *Impacts to On-site Beaver Pond During Low Flow Conditions:* On page 40 of the report, it is concluded that "*both the large flow volume in the Unnamed Creek and the large storage of the pond are expected to minimize any potential effect of the proposed withdrawal on the wetland system and pond.*" The conclusion that pond storage will help minimize pumping effects implies that USA Springs believes that infiltration of water from the pond may occur during pumping. The report does not discuss the effect that pumping the wells during a time of reduced (or even zero) flows in the Unnamed Creek would have on the amount of water in the pond. If stream flow were reduced or eliminated, and if groundwater discharge to the wetland ceased, the pond would lose storage due to evaporation, surface water outflow, and possible infiltration into the ground under pumping stress. These potential wetland effects are not assessed in the application. The water budget also does not incorporate the loss of water to evapotranspiration, as well as the issues described in Finding 17, above.

The application must either contain the information listed above, or an impact monitoring and reporting program in accordance with Env-Ws 388.20 to address these data gaps. The application contains neither. Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

19) *Miscellaneous Omissions in the Application Relative to Wetland Assessment:* Appendix D of the application contains the following omissions or information that is provided has not been updated from the preliminary application to reflect information contained in other sections of the application:

- a) Table 1 which is referenced on page 1, paragraph 2, but is not included in the appendix;
- b) A revision of this section to reflect the zone of influence that was delineated in accordance with the requirements of Env-Ws 388.09(a), Env-Ws 388.06, Env-Ws 388.14 and Env-Ws 379.11(e)(8);
- c) A figure showing the location of onsite wetlands that are described in Attachment C; and
- d) An explanation of how the requirements of Env-Ws 388.09(d) which requires the monitoring of representative wetlands were complied with.

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

20) *Private Well Adverse Impact Assessment:* The application states that the pumping of the three wells may dewater the water column in private wells by a factor of only 10% (page 35). However, this much dewatering may result in the dewatering of a primary water bearing fracture that supplies water to the well, and, as a result an adverse impact in accordance with Env-Ws 388.18(c) could occur. This means an alternative water supply may have to be provided to these water users. The application does not contain a mitigation program in accordance with Env-Ws 388.21(a)(1) as required by Env-Ws 388.17(c).

Projected 180-day drawdown results (Table 4-1) show that four of the domestic wells monitored would experience a drawdown greater than or equal to 10% of the available water column under high recharge conditions. All of these wells (Brett and Stephanie Gillespie, Irene Gillespie, James Page, Jr. and John Pierce) are located along Rt. 4 (Old Turnpike Road), west of the USA Springs site (Figure 3-13). The Brett and Stephanie Gillespie well has a projected drawdown of 61 feet, and the Page well shows a projected drawdown of 39 feet and is more than 3000 feet away from the nearest USA Springs pumping well. Additional wells in this vicinity have projected drawdowns that are greater than 5% of the water column. Of the four wells with greater than 10% projected drawdown, none has a Well Completion Report in Appendix C, and Appendix C contains a questionnaire only for the Pierce well. This questionnaire indicates that a new pump motor was installed in March 2002, but does not provide pump depth or other information. The application asserts (page 35) that "*anticipated depth of pump intakes (is) expected to be ... at sixty to seventy-five percent of the well depth*", but provides no evidence. The report predicts "*no loss of available water to the users of these wells.*" Based on the data presented in the application, this assertion has not been justified.

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed

- 24) *Public Notification*: The Study Area delineated pursuant to Env-Ws 388.06 and 388.14 in Figure 3-1 and described in the report on page 7, paragraph 4, includes the Town of Northwood and a public water system in Barrington, in addition to the Town of Nottingham and Barrington which were included in the original study area delineation. It is DES's understanding that the Town of Northwood and the public water system at the Barrington Home Estates have not received notification in accordance with RSA 485-C:14.

Accordingly DES finds that the information in the report produced in accordance with Env-Ws 388.17 is not complete and correct as required by Env-Ws 388.23(b)(1).

- 25) *Demonstration of Need/Water Efficiency*: RSA 485-C and Env-Ws 388.05 require that an applicant demonstrate a need for a proposed withdrawal. The report requests a permitted withdrawal volume that appears to exceed the volume of water that can be trucked off-site based upon local zoning (see letter and attached affidavit from Town of Nottingham to DES dated March 14, 2003). The report does not address local zoning restrictions on trucking, but rather points to the consumer demand for bottled water as a basis of need. State law (RSA 485-C:4, XII, b) relates the "Demonstration of Need" specifically to implementing water conservation techniques when developing a new large groundwater withdrawal. A permit cannot be issued for a withdrawal volume for the amount of water that exceeds the amount the applicant has demonstrated a need for while implementing water conservation measures, as this would allow for the inefficient use of water.

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is not complete and correct as required by Env-Ws 388.23(b)(1).

- 26) *Monitoring and Reporting Program*: On page 41 of the report, it is explained that the objective of the proposed future monitoring and reporting program is to: "1) *Confirm the conclusions reached on the basis of the withdrawal test*; 2) *Ensure that the operation of the proposed withdrawal does not have any adverse impacts on current water users or wetlands*; and 3) *Collect data needed to make necessary operational changes*." An additional objective of the future monitoring and reporting program must be to address the condition described by Env-Ws 388.20(a)(1). This regulation describes the need to conduct ongoing monitoring upon operating a withdrawal when withdrawal testing data is not sufficient to verify that adverse impacts from a large withdrawal will not occur. Although the withdrawal test included a substantial number of monitoring points, much of the response observed from shallow overburden and surface water monitoring locations was dominated by very high precipitation and highly variable climatic conditions. These influences caused the water level in the shallow monitoring wells to rise at an order of magnitude higher than the typical range of drawdown that is caused by a ten-day withdrawal test. This means that even if corrections for precipitation were applied to the data and analysis in the application, much of the wetland environmental monitoring data would likely remain ambiguous and require ongoing monitoring in accordance with Env-Ws 388.20.

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1); and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).

in water samples collected at the USA Springs site or at the K&B Realty Site. Often, the sporadic occurrence of trace concentrations of toluene detected in groundwater is associated with materials used to construct, pump or sample the groundwater, and these measurements are considered to be anomalies that are verified through follow-up water quality sampling. However, toluene was routinely detected in groundwater samples obtained from well on the K&B Realty and USA Springs site.

The application does not contain information necessary to meet the requirements of Env-Ws 389.20(c) or Env-Ws 389.17 which are applicable when contamination exists in the source water protection area. Section 3.4.3 of the application proposes a conceptual design for a hydraulic barrier to contain VOCs. However, the application does not provide conclusive information regarding the source of the contamination, and the vertical and horizontal extent of the contamination, and therefore putting forth technically defensible remediation designs is not possible. Furthermore, USA Springs proposes to install an extraction and injection system onsite to achieve hydraulic containment. However, it is known that contamination and the zone of influence associated with USA Springs' withdrawal exists off-site, and therefore it is not apparent that an on-site containment system will capture and contain contaminated groundwater, and block the migration of contamination to the pumping wells at USA Springs and all of the residential wells that tap the same bedrock aquifer in the zone of influence of the proposed withdrawal. The design of a typical containment system includes extensive site investigations in the vicinity of the contamination and pumping wells, and the development of a calibrated multiple layer three-dimensional groundwater flow and fate and transport models to demonstrate that the proposed hydraulic containment system is effective at not only altering groundwater gradients, but also effective in actually capturing contamination, and blocking the migration of contamination to all pumping wells.

There are no reliable analytical desktop techniques that could determine how the shallow and deep overburden aquifers and the bedrock aquifers would exactly respond when operating the proposed withdrawal at USA Springs with a containment system nearby. Nor is there an adequate amount of data available to complete such analysis, because the withdrawal test performed by USA Springs was not designed to obtain the data necessary to design an off-site containment or remediation system or to assess how such a remediation system would respond when the proposed large withdrawal is activated. This information would have to be collected by conducting tests in the field, and it appears that work of this nature has not been completed. If ultimately additional withdrawals will occur as part of a remediation or containment system, then these new stresses will have to be assessed cumulatively with the withdrawals proposed for the bottling plant in accordance with Env-Ws 388.06(m)(4), Env-Ws 388.06(l), and Env-Ws 388.14.

The operation of the large withdrawal from bedrock at USA Springs in close proximity to VOC contamination is further complicated by preferential fracture flow, the interconnectivity of the overburden and bedrock aquifers, and the number and proximity of private water supply wells installed in the bedrock aquifer in the zone of influence of the proposed withdrawals. Data from the withdrawal test demonstrates that the pumping of the proposed wells causes the greatest amount of drawdown in bedrock wells surrounding the K&B Realty site (see Figure 3-13). USA Springs' proposed pumping wells are installed in the deep bedrock aquifer, and therefore the pumping of these wells will draw water from a fracture network in the bedrock and from the overlying overburden aquifer. Most of the residential wells surrounding the USA Springs site and in the zone of influence delineated in the application also obtain water from wells installed in the shallow or deep bedrock

aquifer. Contamination has been identified as occurring in the shallow overburden, deep overburden, and bedrock aquifer. This means that a containment system will have to be effective at not only preventing the horizontal migration of contaminants towards USA Springs' site in the horizontal direction, but also the downward vertical migration where water is drawn from the overburden into fracture flow network when the wells at USA Springs are pumping. According to the application, the majority of the water derived from the wells at USA Springs comes from an area fully encompassing the K&B Realty site, and therefore it will be very difficult to design a remediation system to contain contamination in the overburden and bedrock aquifers while the pumping of the USA Springs wells is depressing the water table in the deep overburden, shallow bedrock aquifers, and deep bedrock aquifer. Yet this containment is required to demonstrate that an adverse impact will not occur by drawing contaminants into the bedrock aquifer that is the drinking water source for the majority of the residents in this area and the source of water for USA Springs' proposed wells. The vertical control of contaminant migration is further complicated by the fact that the contaminants of concern are chlorinated organic compounds with a density greater than water, meaning that over time they will migrate in a downward vertical direction.

The data in the application does not support its assertion that water bearing fractures for USA Springs' extraction wells 1 and 2 are naturally insulated (or vertically distant) from the groundwater quality impacts identified in shallow overburden and the upper portion of the bedrock aquifer for the following reasons:

- a) The application demonstrates that the pumping of the wells alters water levels in the deep overburden aquifer (DES does not believe the application provided sufficient information describing the communication with the shallow aquifer due to high recharge events, and this relationship must also be characterized).
 - b) There is evidence that a chlorinated solvent was detected in the proposed extraction well, USA-4. Based upon step-test data obtained by Geosphere in 2001, USA-4 is interconnected with the other two extraction wells, USA-1 and USA-2.
 - c) The application indicates repeatedly that the bedrock aquifer is readily recharged by precipitation. The application also states that recharge to USA-1, 2, and 4 comes from a relatively small source water protection area. If this is the case, the fact that the withdrawals are readily recharged from a small area containing the contamination site with no controls does not support the application's assertion that there is a natural barrier between the contaminated site and the deep bedrock aquifer which is the source of USA Springs' proposed withdrawals.
 - d) Contamination has already been determined to be present in the shallow overburden, deep overburden, and bedrock aquifer, therefore there does not appear to be an effective natural barrier as suggested by the application.
 - e) Contradictions exist regarding the conceptual model contained in the application (see Finding 3). Therefore, the application does not provide a convincing argument that contamination is insulated from the water bearing fractures of USA Springs' production wells. Many sections of the application assert a strong connection of the bedrock aquifer, the proposed pumping
-

wells, and recharge from precipitation, so it does not seem possible that a natural barrier exists for contamination, but not for water derived from precipitation.

Env-Ws 388.18(c)(10) states that an adverse impact includes *"the contamination of groundwater obtained from wells or surface waters from contaminated groundwater whose flow has been altered by the withdrawal."* The application provides data that assesses the relationship between the USA Springs' withdrawals from bedrock wells, and water levels in the overburden and bedrock aquifers. The application determined that the pumping of the wells at USA Springs caused the most impact to water levels wells located on Route 4, in close proximity to the K&B Realty property. According to the application, groundwater samples obtained from monitoring OW-1, OW-1D, OW-3, and OW-4 all exhibited groundwater contamination. The application also indicated that the water level in monitoring well P-8D, installed in the deep overburden, responded to the pumping of the bedrock wells. P-8D was the only deep overburden well monitored in close proximity to the contaminated area of the site. The change in water level in P-8D was noted apparently without correcting the water levels for high recharge events (see Section 2.1.1). This information suggests that an adverse impact as described by Env-Ws 388 (c)(1) may occur immediately. The application also does not contain information to support its assertion on pages 33-34 that the groundwater contamination is "no doubt" stable. Even the limited data presented in Tables 3-11 and 3-12 show major fluctuations in VOC levels, contradicting the conclusion that conditions are stable.

Env-Ws 388.23 (b)(2) states that a large groundwater withdrawal may only be issued *"when information in the report produced in accordance with Env-Ws 388.17 demonstrates that the withdrawal will:*

- a. Not produce adverse impacts; or*
- b. Result in impacts that can and will be mitigated, provided:*
 - 1. There is sufficient information to verify that any adverse impacts that occur as a result of the withdrawal will not be:*
 - (i) An adverse impact that may occur immediately; and*
 - (ii) An irreversible impact."*

The application contains insufficient information to demonstrate that an adverse impact will not occur due to the alteration of the flow of contaminated groundwater. It also does not include a monitoring, reporting, and mitigation plan to prevent the occurrence of such an impact. Even if provided, a mitigation plan may have not satisfied the requirements of Env-Ws 388.21(a)(2) which requires the development of a monitoring and reporting program to accompany a mitigation plan, because there does not appear to be sufficient information in the application to demonstrate compliance with Env-Ws 388.20(a)(1). This regulation states that monitoring and reporting is not allowed in lieu of data obtained during withdrawal testing if an impact may be "irreversible" or "will occur immediately". The alteration of contaminated groundwater flow would likely result in the immediate and, for all practical purposes, irreversible contamination of groundwater that is also utilized by other private water users. Although all groundwater contamination can ultimately be remediated the term

"irreversible" is determined to be applicable to this scenario because remediation can take years to decades to complete.

In summary, the application contains the following deficiencies relative to uncontrolled contaminations sources:

- a) The proposed source has an inadequately controlled source in the source water protection area as described by Env-Ws 389.20(c)(1) and the application does not contain the basic elements for the Contamination Control Program required by Env-Ws 389.17.
- b) Basic hydrogeologic data contained the application does not meet the requirements of Env-Ws 389 or Env-Ws 388.
- c) The withdrawal proposed in the application may result in an unmitigated impact as defined by Env-Ws 388.18(c)(10) if the withdrawal was approved. The application does not contain sufficient information to determine that a hydraulic containment system could prevent the proposed large groundwater withdrawal from altering the flow of contaminated groundwater, thus impact other private water users. The application also does not contain information that demonstrates that the impacts associated with the withdrawal will not be immediate or irreversible as required by Env-Ws 388.20(a)(1).

Accordingly, DES finds that the information in the report produced in accordance with Env-Ws 388.17 is: 1) Not complete and correct as required by Env-Ws 388.23(b)(1) and Env-Ws 389.20; and 2) Not assessed accurately to the extent that it can be demonstrated that the withdrawal will not produce impacts or result in impacts that can and will be mitigated as required by Env-Ws 388.23(b)(2).



The State of New Hampshire
Department of Environmental Services



Michael P. Nolin
Commissioner

December 11, 2003

Mr. Francesco Rotondo
USA Springs, Inc.
9 Regis Drive
Pelham, New Hampshire 03078

Subject: USA Springs – Findings and Decisions on an Application for a New Source of Bottled Water and Large Groundwater Withdrawal Permit Rehearing

Dear Mr. Rotondo:

The purpose of this letter is to inform you that the New Hampshire Department of Environmental Services (Department) finds that, based upon the information contained in the record for the USA Springs Site:

- 1) The request for issuance of a large groundwater withdrawal permit in accordance with Env-Ws 388 is denied; and,
- 2) The request for approval of a new source of bottled water in accordance with Env-Ws 389 is denied.

This decision is based on issues pertaining to the occurrence, understanding, and control of the fate and transport of groundwater contamination in the zone of contribution, zone of influence and source water protection area of USA Springs' proposed large groundwater withdrawal. The Department finds that other aspects of USA Springs' submittals are consistent with the requirements of RSA 485:3, RSA 485-C, Env-Ws 388 and Env-Ws 389.

In summary, the information USA Springs has submitted to the Department contains the following deficiencies relative to uncontrolled contamination sources:

- a) The proposed withdrawal has an inadequately controlled source in the source water protection area as described by Env-Ws 389.20(c)(1).
- b) The application does not contain the basic elements for the Contamination Control Program required by Env-Ws 389.17.
- c) The withdrawal as proposed by USA Springs may result in an unmitigated adverse impact as defined by Env-Ws 388.18(c)(10) if the withdrawal was approved.
- d) The application also does not contain information that demonstrates that the alteration of contaminated groundwater flow will not be immediate or irreversible as required by Env-Ws 388.20(a)(1).

Consequently, the Department finds that the information submitted by USA Springs does not meet the requirements of Env-Ws 388 and Env-Ws 389.

Throughout the permitting process, the Department met with representatives of USA Springs and its agents upon the request of USA Springs. In addition, the Department continued to accept public comment throughout the permitting process. The Department also provided towns (Nottingham, Barrington, Northwood, and various other towns) and the Strafford Regional Planning Commission with copies of much of the relevant correspondences regarding USA Springs' proposal. Consistent with the Department's approach to processing permit applications for other large groundwater withdrawal applications with interested public citizens and municipal representatives, the Department maintained a public contact list for the project and conducted multiple public information meetings on the permit application. As it has with other large groundwater withdrawal applications (Breakfast Hill Golf Course, Golf Club of New England, Granite Fields Golf Course, Lake Winnepesaukee Golf Club, and Merrimac, MA proposed withdrawal in Newton, NH), the Department sent notifications to the individuals on the public contact list regarding the status of the proposed application. As with other groundwater permit applications, these notices were sent via direct mailing and/or by e-mail broadcasts.

In addition to the June 18, 2001 public hearing, the Department conducted public information meetings in Nottingham on July 17, 2001, August 29, 2002, and October 14, 2003 and in Barrington on August 1, 2001. These types of public meetings have also been offered and conducted for other large withdrawal permit applications.

1.2 Project History

1.2.1 Preliminary Applications

On May 24, 2001, USA Springs submitted a Preliminary Large Groundwater Withdrawal Application as described in Section 1.0 above. Upon completion of the public notification requirements, the public hearing, and written public comment period, the Department issued technical comments dated August 14, 2001 on the preliminary application. USA Springs issued a revised preliminary application on August 17, 2001, and the Department noted in a letter dated September 6, 2001 that the August 17, 2001 submittal did not address the items in the Department's August 14, 2001 letter. On December 20, 2001, USA Springs submitted another revised preliminary application, and with this submittal explained that the August 17, 2001 submittal was prepared without knowledge that the Department was preparing the August 14, 2001 letter. The Department issued technical comments on the December 20, 2001 Preliminary Application on February 26, 2002. USA Springs submitted a final revised preliminary application on July 18, 2002. This document indicated that USA Springs no longer would pursue a spring source of water, and instead would only be applying for a permit to withdraw groundwater from the three on-site bedrock wells. The Department issued technical comments on this document in a letter dated September 11, 2002.

In all of the revised preliminary applications submitted after August 17, 2001, a portion of the Town of Northwood fell within the proposed "Study Area" as delineated pursuant to N.H. Admin. Rules Env-Ws 388.06. In accordance with Env-Ws 388.11, municipalities located within the Study Area must be provided with a copy of the permit application. Northwood had not been placed on notice in accordance with Env-Ws 388.11. However, the Town of Northwood has: 1) been provided copies of the preliminary applications; 2) attended and participated in the public hearing on June 18, 2001 and subsequent public information meetings; and 3) submitted written comments to the Department throughout the permitting process. Although notice to Northwood

did not technically comply with the requirements of Env-Ws 388.11, actual notice was given to the Town and the Town has actively participated in the permit process. Thus, the Department finds that the requirements of notice and participation have been met.

At the request of USA Springs, the Department conducted a site visit on September 26, 2002 to review observation points proposed by USA Springs for its proposed withdrawal test. Prior to conducting the site visit, the Department sent USA Springs a letter dated September 23, 2002, indicating that it could not verify the overall adequacy of the withdrawal test monitoring network because USA Springs had not yet identified all types of water users and water resources as requested in the Department's September 11, 2002 letter. During the site visit, the Department also reiterated previous comments about the need for USA Springs to install a monitoring well adjacent to the Harnum Property (also known as the "Just Cause Site" and the "K&B Realty Site"), to address allegations of contamination originating from the Harnum Property. USA Springs had been made aware of the potential for groundwater contamination at the Harnum Property on several occasions: at a public hearing on June 18, 2001; in a letter from an individual to the Department dated July 30, 2001 which was submitted to USA Springs on August 9, 2001 (with copies of all written comments received by the Department), in the Department's August 14, 2001 comment letter to USA Springs; and in a letter dated February 26, 2002 from the Department to USA Springs.

1.2.2 Withdrawal Testing

In order to satisfy the requirements of N.H. Admin. Rules Env-Ws 388, Major Groundwater Withdrawal, an applicant must implement a monitoring and reporting program in accordance with Env-Ws 388.20, which states, in part, that such a program shall be conducted when "[a]vailable information, including work completed in accordance with these rules, is not sufficient to verify that adverse impacts from the large withdrawal will not occur, provided the available information does not suggest that an impact is:

- a. Irreversible; or
- b. Will occur immediately"

USA Springs noted the significance of conducting such a test in a controlled manner and under somewhat controlled conditions in its July 18, 2002 preliminary application when it stated that "*if during the withdrawal test, the yield of the bedrock aquifer is determined to be insufficient to produce the design flow rate determined on the basis of the pre-withdrawal test, the test will be stopped. All data from the pressure transducers will be downloaded and saved and groundwater elevations will be allowed to recover before a new test can be conducted.*" In the same document, USA Springs stated "*precipitation will be measured at the Site to an accuracy of 0.01 feet before (1 week), during, and in the recovery portion of the proposed test. In the event of a 1" rainfall event, the withdrawal test will be terminated. All groundwater data from the pressure transducers will be downloaded and saved and groundwater elevations will be allowed to recover prior to commencing another test.*" USA Springs conducted the withdrawal test from November 19 through November 29, 2002. The timing of the withdrawal test was determined by USA Springs. Prior to and during the withdrawal test, aquifer and surface water levels were significantly impacted by variables such as rain, snow, temperature fluctuations (including freezing temperatures) and melting snow. Also, during the withdrawal test, USA Springs altered the flow rates of all three of its production wells, thus introducing an additional variable into the

withdrawal test. USA Springs reduced the cumulative withdrawal rate of the three wells from 439,000 gallons per day to 310,000 gallons per day, an almost 30% reduction from the originally proposed production volume. Nonetheless, USA Springs continued the withdrawal test even though both the precipitation criteria and varying extraction rate criteria it established were not adhered to.

The results of the withdrawal test conducted by USA Springs demonstrated that more total impacts, and more impacts over a greater distance, occurred than for any other similar large groundwater withdrawal permit application reviewed by the Department. This was true even though the number of competing water users and water resources in the region was much lower for the USA Springs' site than comparable sites.

1.2.3 Final Report

On February 4, 2003, USA Springs submitted the Final Report for a large groundwater withdrawal and new source of bottled water pursuant to the requirements of Env-Ws 388.17 and Env-Ws 389.19.

In accordance with Env-Ws 388.23, the Department then had 45 days to make a final decision on the Final Report for a large groundwater withdrawal permit. In a letter dated February 28, 2003, USA Springs requested a 45-day review period extension for the Department to act on the application. USA Springs included no additional technical data with this request. On March 20, 2003, USA Springs revised its February 28, 2003 extension request to extend the Department's review period to August 12, 2003. USA Springs advised the Department that the request would "provide additional time to review conditions at the boundary of the Applicant's property." No additional technical information was provided with this request. The Department granted the March 20, 2003 time extension request.

On April 11, 2003, the Department issued preliminary technical comments on the February 3, 2003 Final Report for issues pertaining to water quantity.

In the April 11, 2003 letter, the Department also commented that the overall monitoring and reporting program did not demonstrate: 1) How uncertainty associated with data USA Springs collected during the withdrawal test was accounted for; 2) How the monitoring program was adequate to ensure that adverse impacts, as defined by Env-Ws 388.18, would not occur; and 3) How the monitoring program included the monitoring of representative water resources. This information is required by Env-Ws 388.20(a) and (b). The Department elaborated on these issues in the April 11, 2003 letter and the August 12, 2003 Final Decision. In general, the monitoring program proposed in the February 3, 2003 final application was inadequate and did not comply with Env-Ws 388. The Department's April 11, 2003 letter also indicated that USA Springs' February 3, 2003 Final Report contained many contradictions that needed to be resolved.

On May 9, 2003, Department staff met with representatives of USA Springs, at which time the Department explained that "water quantity", but not contaminated groundwater, issues might be resolved through implementation of an acceptable monitoring, reporting and mitigation program, such as implemented at GCNE and other permitted sites, that satisfies the requirements of Env-Ws 388. The Department suggested that USA Springs consider the permit and reports associated with the large groundwater withdrawal permit for GCNE as a possible model to address water

quantity issues. Comprehensive monitoring, reporting and mitigation programs have been used at GCNE and other sites as an approach to address uncertainties associated with withdrawal tests. USA Springs representatives had copied the GCNE file in November 2002, and therefore had this information available. These discussions did not form a basis for project approval in the absence of submittal of an acceptable monitoring, reporting and mitigation program by USA Springs and approval by the Department.

On August 11, 2003, one day prior to the day that the Department was required to make a final decision on the large groundwater withdrawal permit and new source of bottled water applications, USA Springs submitted a written request for a third extension of the review period. At the time USA Springs submitted the third extension request, it had not submitted any substantive information in response to the Department's April 11, 2003 letter or provided additional technical information on the contamination issues. In a letter dated August 12, 2003, the Department denied the third review period extension request.

1.3 Decision on the Permit Application

On August 12, 2003, the Department denied approval for a new source of bottled water under Env-Ws 389 and denied the large groundwater withdrawal permit in accordance with Env-Ws 388. At the time that these denials were issued, USA Springs had not submitted any additional technical information to supplement the Final Report. The basis for denial was consistent with the preliminary comments provided in the Department's April 11, 2003 letter. In addition, the August 12, 2003 decision included findings relative to groundwater contamination. USA Springs responded to the Department's April 11, 2003 letter at 3:45 PM on August 12, 2003, more than five hours after the Department had delivered the August 12, 2003 decision to legal counsel for USA Springs.

In the decision dated August 12, 2003, the Department outlined the rehearing process provided by RSA 485-C:21, VI for USA Springs to submit additional information and request reconsideration of the August 12, 2003 decision.

1.4 Motion for Reconsideration

On September 11, 2003, USA Springs submitted a Motion for Rehearing. On September 19, 2003 the Department partially granted the Motion for Rehearing and established the following schedule that would govern the rehearing process:

- 1) By September 29, 2003 USA Springs would submit any information it deems necessary for Department consideration in rendering a decision on the Motion for Rehearing.
 - 2) Between September 30, 2003 and October 29, 2003, the Department would accept written comments from interested municipalities and citizens on the information contained in the record.
 - 3) Between October 30, 2003 and November 10, 2003, USA Springs could submit any additional information it deems necessary for Department consideration in rendering a decision on the Motion for Rehearing.
-

- (3) *A reduction in a water supply that is used for a multiple unit dwelling residence, but that is not a public water supply, that results in the inability to continue established activities or maintain existing water capacity requirements;*
- (4) *A reduction in a private, non-residential, non-drinking water supply that results in the inability of a commercial, industrial or retail facility to continue established services or production volumes;*
- (5) *A reduction in the ability of a registered water user to produce volumes equivalent to the average daily withdrawal for a specific calendar month as determined by discharge measurements and reports made to the department in accordance with the water user requirements under Env-Wr 700;*
- (6) *Reduction in surface water levels or flows that will, or does cause a violation of surface water quality regulations set forth in Env-Ws 1700;*
- (7) *A net loss of values for submerged lands under tidal and fresh waters and its wetlands as set forth in RSA 482-A;*
- (8) *The inability of permitted surface water or groundwater discharges to meet permit conditions;*
- (9) *A reduction of river flows below acceptable levels established pursuant to RSA 483; or*
- (10) *The contamination of groundwater obtained from wells or surface waters from contaminated groundwater whose flow has been altered by the withdrawal.*

2.2 New Source Approval for Bottled Water – Env-Ws 389

Env-Ws 389 sets forth criteria relative to source water protection (wellhead protection), water quality, and impacts to other water resources that must be applied when considering new sources for bottled water for approval in accordance with RSA 485:3 XI. Env-Ws 389.20 contains criteria for determining whether a proposed source of water must be approved or denied. Specifically this rule states the following:

Env-Ws 389.20 Criteria for Approval or Denial of New Sources

- (a) *Notwithstanding Env-Ws 389.20 (b) and (c) below, upon determining that the report required in accordance with Env-Ws 389.19 contains all the required information, that it is correct and complete, and that all specified requirements of Env-Ws 389 and We 600 have been met, the department shall approve the source and notify the applicant and the department of health and human services that the source has been approved.*
 - (b) *If the report is deficient in any of the criteria in Env-Ws 389.19, the applicant shall be notified in writing.*
-

3.2 *Issues Associated with Groundwater Contamination*

3.2.1 Groundwater Contamination near USA Springs

Contamination has been identified in the shallow overburden, deep overburden, and bedrock aquifer in an area fully encompassed by the zone of influence caused by USA Springs' proposed large groundwater withdrawal application. The occurrence of contamination is summarized in Appendix 3, attached to this document. Regulated contaminants as defined by Env-Ws 389.03 exist in the proposed source water protection area and estimated zone of influence delineated within the application. The contaminants present include some regulated by the Safe Drinking Water Act, RSA 485 and associated rules, Env-Ws 310-319 and contaminants regulated by the Groundwater Protection Act, RSA 485-C and associated rules, Env-Ws 1403, that establish ambient groundwater quality standards.

The results of the withdrawal testing program demonstrated that the pumping of USA Springs' wells caused the greatest amount of drawdown in USA Springs Pumping Wells and in private water supply bedrock wells to the west of the USA Springs' site along Route 4. The Harnum site is located directly between USA Springs pumping wells and these private bedrock water supply wells. All eight of the bedrock wells monitored along Route 4, west of USA Springs' pumping wells showed a definitive response to pumping. The estimated 180 day, no net recharge drawdown caused by USA Springs' withdrawal in the private bedrock water supply wells ranges from 14 to 55 feet (median drawdown - 27 feet, average drawdown - 33 feet). These are significant drawdown levels that indicate a direct connection between these wells and USA Springs pumping wells. Although no monitoring wells were monitored at the Harnum site during the withdrawal test, there is a significant amount of data that demonstrates water levels of the bedrock aquifer will be preferentially altered underneath the contaminated site by USA Springs' pumping wells, thus altering the natural flow direction and velocity of contaminated groundwater.

Before USA Springs' application to pump groundwater for its bottling facility could be approved, a containment system would have to be implemented and demonstrated to be effective at preventing the horizontal and vertical migration of contaminants under both non-pumping and pumping conditions at USA Springs. In this case, the vertical control of contaminant migration is further complicated by the fact that the contaminants of concern are chlorinated organic compounds with a density greater than water, meaning that over time they will migrate down into the deeper aquifer(s). To demonstrate that an adverse impact will not occur, an implemented treatment and containment remedy must ensure that contaminants will not be further drawn into the bedrock aquifer in the surrounding area, either vertically or horizontally. In this area, the aquifer is an important water supply resource not only as the possible source for USA Springs, but also for the majority of the existing residents whose drinking water wells are drilled into this aquifer. Based on data provided by USA Springs, groundwater derived from the wells at USA Springs would receive flow through an area in the aquifer beneath the surface of the Harnum Site where contamination exists. In a Remedial Action Plan (RAP) received August 12, 2003 and amended by supplemental material submitted November 10, 2003, USA Springs has proposed, at a conceptual level, a remedial action that would include the pumping and treatment of contaminated groundwater to prevent the vertical and horizontal migration of contamination and create a hydraulic barrier to contain groundwater contamination. While this may be an appropriate remedy, as discussed in more detail below, there is currently inadequate data to conclusively demonstrate that implementation of this remedy would be successful to the extent

that the proposed USA Springs wells could be pumped at the proposed production volumes without adverse or irreversible impacts.

The Department finds that the data in the application does not support USA Springs' assertion that water bearing fractures for USA Springs' extraction wells USA-1 and USA-2 are naturally insulated (or vertically distant) from the groundwater quality impacts identified in shallow overburden and the upper portion of the bedrock aquifer for the following reasons:

- a) The pumping from the extraction wells alters water levels in the deep overburden aquifer.
- b) There is evidence that a chlorinated solvent was detected in proposed extraction well USA-4. Based upon step-test data obtained by Geosphere in 2001, USA-4 is interconnected with the other two extraction wells, USA-1 and USA-2.
- c) The application states that the bedrock aquifer is readily recharged by precipitation. The application also states that recharge to USA-1, 2, and 4 comes from a relatively small source water protection area. The fact that the withdrawals are readily recharged from a small area containing the uncontrolled contaminated site does not support the application's assertion that there is a natural barrier between the contaminated site and the deep bedrock aquifer which is the source of USA Springs' proposed withdrawals.
- d) Contamination has already been determined to be present in the shallow overburden, deep overburden, and bedrock aquifer; therefore, the evidence does not support a conclusion that there is an effective natural barrier as suggested by the application.
- e) The Department finds that the contamination is not insulated from the water bearing fractures of USA Springs' production wells. Many sections of the application assert a strong connection of the bedrock aquifer, the proposed pumping wells, and recharge from precipitation. The connection between the overburden and bedrock aquifers, and connection between the bedrock aquifer and the proposed pumping wells will apply equally to recharge from precipitation and the flow of contaminated groundwater.
- f) The Department concludes that evidence supports a finding that there is an interconnection between the shallow overburden, deep overburden, and bedrock aquifer at the Harnum Site. The Department finds that there is an interconnection between the contaminated bedrock aquifer and USA-1, USA-2 and USA-4.
- g) The Department finds that even if USA-4 is not activated, there is an interconnection between the contaminated bedrock aquifer and USA-1 and USA-2

The Department finds that the contamination on the Harnum property is an "inadequately controlled source" that is within the source water protection area. The application accordingly must be denied under the requirement of Env-Ws 389.20(c) of the bottled water rules. ["The proposed source must be denied under the following conditions: (a) *If an inadequately controlled source is present in the source water protection area....*"]

3.2.2 Alteration of Contaminated Groundwater Flow

Large Groundwater Withdrawal rule Env-Ws 388.23 (b)(2), states that a large groundwater withdrawal permit may only be issued *“when information in the report produced in accordance with Env-Ws 388.17 demonstrates that the withdrawal will:*

- a. Not produce adverse impacts; or*
- b. Result in impacts that can and will be mitigated, provided:*
 - 1. There is sufficient information to verify that any adverse impacts that occur as a result of the withdrawal will not be:*
 - (i) An adverse impact that may occur immediately; and*
 - (ii) An irreversible impact.”*

Since the contamination was initially discovered by samples collected during the withdrawal test process, the withdrawal test performed by USA Springs was not designed to obtain the data necessary to develop an off-site containment or remediation system or to assess how such a remediation system would respond when the proposed large withdrawal is activated. This information would have to be collected by conducting tests in the field, and work of this nature has not been submitted to the Department. To date, the Department has not received withdrawal test results that would demonstrate the volume of water that can be safely withdrawn from the USA Springs' extraction wells without causing an irreversible adverse impact and/or causing an immediate adverse impact. The Department has also not received withdrawal test results that would demonstrate the hydraulic impact resulting from an implemented RAP with the large groundwater withdrawal in operation.

Env-Ws 388.18(c)(10) states that an adverse impact includes *“the contamination of groundwater obtained from wells or surface waters from contaminated groundwater whose flow has been altered by the withdrawal.”* The February 3, 2003 Final Report and supplemental information provided in August, September, October, and November of 2003 provides data that assesses the relationship between the USA Springs' withdrawals from bedrock wells, and water levels in the overburden and bedrock aquifers. The pumping of the USA Springs wells caused the most impact to water levels in wells located on Route 4, in close proximity to the Harnum Site, although as stated in the previous section, water levels in the area of contamination were not directly measured as part of the withdrawal test conducted by USA Springs. According to the application, volatile organic compounds above ambient groundwater quality standards and Safe Drinking Water Act maximum contamination levels were detected in groundwater samples obtained from a number of monitoring wells. This information is summarized in Appendix 3 as derived from various reports on the Harnum Site.

The Department finds that USA Springs has failed to demonstrate that its proposed withdrawal will not produce adverse impacts to surrounding private water supply wells from the contamination source on the Harnum Site. Further, the Department finds that if such adverse impacts to the surrounding wells should occur, the effects would be immediate and irreversible.

3.2.3 Compliance with Bottled Water Regulations – Env-Ws 389

The Department finds that USA Springs' application with supplemental material provided on August 12, 2003, September 11, 2003, September 29, 2003, and November 10, 2003 is consistent with the requirements of Env-Ws 389 for all issues except those associated with the uncontrolled source of contamination. The approval USA Springs seeks is denied based on the rules pertaining to groundwater contamination.

The criteria for approving or denying new sources of bottled water is as follows:

Env-Ws 389.20(c) – Criteria for Approval or Denial of New Sources, states that *"the proposed source shall be denied under the following conditions:*

- 1) If an inadequately controlled contamination source is present in the source water protection area; or*
- 2) If the applicant has failed to perform any activity or to meet any of the requirements contained in these rules."*

The Bottled Water Rules (Env-Ws 389.17 – Contamination Control Program) also states:

- "(a) The applicant shall establish a contamination control program which minimizes the risk of contamination from known sources of contamination.*
- (b) The program shall include provisions and a schedule for remediation and/or monitoring of residual contamination from all known contamination sources, identified in accordance with Env-Ws 389.16, which ensures that contamination shall not reach the groundwater source of bottled water.*
- (c) Compliance of a known contamination source with the conditions of a groundwater management permit in accordance with Env-Ws 410 or successor rules, shall constitute an adequate control program.*
- (d) A description of the contamination control program and supporting evaluations and documentation shall be provided in the report required in accordance with Env-Ws 389.19."*

In a letter dated November 21, 2003, the Department's Waste Management Division commented on documents entitled, "Supplemental Site Investigation Report" (Supplemental SIR), and "Supplemental Remedial Action Plan" (Supplemental RAP), prepared by MyKroWaters, Inc. (MyKroWaters) submitted on behalf of Just Cause Realty Trust LLC on November 10, 2003. These documents were presented as supplements to the SIR and RAP that were received by the Department on August 12, 2003. In the November 21, 2003 letter, the Department determined that the component of the RAP dealing with hydraulic containment of the contaminant plume under the pumping conditions proposed for the USA Springs production wells could not be approved.

scrap metal yard. Over the next eight years, the source of the contamination was investigated, and a remediation system was designed. In 1996, the remediation system was activated at the scrap metal yard to contain the contamination and, in 1998, MVD began coordinating with the Department to assess whether MVD-6 could be used again as source of drinking water. Over the next year, the Department and MVD developed a scope of work for evaluating the feasibility of reactivating MVD-6 as a drinking water source. In 1999, MVD implemented an investigation that consisted of a 29-day withdrawal test (29 days represents the pumping portion of the test only) to determine if MVD-6 could be operated without breaching the nearby containment system. During the 29 day withdrawal test, water quality samples and water level measurements were collected at 44 monitoring locations. Water quality samples were collected and analyzed utilizing a field laboratory during the withdrawal test to verify that the containment system was not being breached. Upon the completion of the test, MVD completed and calibrated a very complex three dimensional flow model for the entire aquifer. Using the model and withdrawal test data, a recommendation was made by MVD-6 to connect this well to the water system once some modifications were made to the existing remediation system at the industrial site. MVD also recommended that MVD-6 be operated at a reduced extraction rate for several years. At this time, MVD-6 is not connected to the water system, and MVD has verbally indicated to the Department that it will not seek formal permission to connect the well to the water system for several years.

The examples given above reflect the Department's approach to dealing with the use of sources of water in close proximity to contamination. None of these wells have been used upon detection of contamination until containment has been demonstrated to be effective and the water supply withdrawal meets regulatory standards, thus providing clean and safe drinking water.

When a permit is issued, the Department makes findings that the proposed project complies with the relevant laws and regulations. In some cases, the Department has included conditions in permits to operate new sources of water but only:

- 1) to address minor deficiencies that can be controlled and mitigated by clearly prescribed actions taken by applicant; and/or
- 2) to require a detailed response plan tied to specific quantitative and qualitative standards which are necessary to ensure a project remains in compliance with the regulatory requirements under varying conditions over time; and
- 3) when otherwise authorized by law.

The conditions sought by USA Springs do not fit within these categories. The Department's decision is not based on disparate treatment of USA Springs. This decision is based on a technical evaluation and application of the governing statutes and regulations.

4.0 NAFTA

Several comments have been submitted to the Department regarding the North American Free Trade Agreement relative to the State of New Hampshire's authority to regulate a groundwater withdrawal under RSA 485-C if the water is used as a commodity sold internationally. The

based on science, and the relationship of the applicable statutes and rules to the proposed project. The Department concludes that USA Springs claims of “unfair treatment” are without merit.

6.0 DECISION ON REHEARING

Based on above findings and determinations, the Department affirms its Decision and Findings of August 12, 2003. USA Springs’ applications for a large groundwater withdrawal permit and approval of a new groundwater source of bottled water are denied.

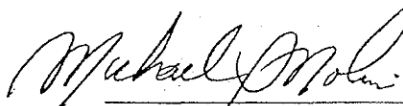
7.0 APPEALS OF THIS DECISION

Any party aggrieved by the decisions made in this document for the denial of the large groundwater withdrawal permit based on the requirements of Env-Ws 388 may appeal the decision in accordance with RSA 485-C:21, VI and RSA 541.

Any party aggrieved by the decisions made in this document for the denial of the new source of bottled water based on the requirements of Env-Ws 389 may appeal the decision in accordance with RSA 21-O:14.

Date:

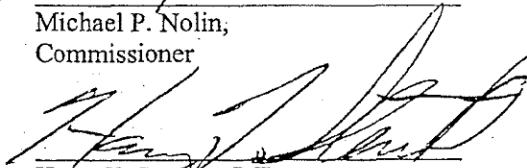
12 11 03



Michael P. Nolin,
Commissioner

Date:

December 11, 2003



Harry T. Stewart, P.E.,
Director

Appendix 1: Comparison of the USA Springs' Proposed Large Withdrawal Versus GCNE

	USA Springs	GCNE
Date Permitting of Project Initiated	May 2001	December 2000
Date The Department Adopted Large Groundwater Withdrawal Regulations	April 21, 2001	
Date Permit Was Issued for Project	Not Applicable	December 19, 2001
Observation points monitored during withdrawal testing	Approximately 81	Approximately 65
Duration of Antecedent Period	28 days	20 days
Duration of Pumping During Withdrawal Testing	10 days	8 days
Duration of Recovery Period	5 days	6 days
Groundwater Contamination in the Overburden within the Zone of Influence	Yes – Present on USA Springs site and at adjacent site	None
Groundwater Contamination in the Deep Bedrock Aquifer within the Zone of Influence	Yes – Present on USA Springs site and at adjacent site	None
Groundwater Contamination in the Shallow Bedrock Aquifer within the Zone of Influence	Yes – Present on USA Springs site	None
Withdrawal Test Conditions	Very Poor – Above average precipitation including rain and snow. Extreme temperature fluctuations causing surface water bodies to freeze at times and snow to melt at other times. Withdrawal test was completed during a time of year when water tables increase naturally thus masking the effects of drawdown caused by the proposed pumping wells.	Ideal – Minimal precipitation occurred. Completed during a time of year where water levels decline naturally. No data correction required
Amount of Precipitation Received 30 days prior to the withdrawal test	5.45 inches	1.15 inches

Appendix 1 (continued): Comparison of the USA Springs' Proposed Large Withdrawal Versus
GCNE

	USA Springs	GCNE
Amount of Precipitation received 7 days prior to the withdrawal test	2.81 inches	0 inches
Amount of Rain received during the withdrawal test	0.58 inches	trace
Melting Snow During Withdrawal Test	Yes	No
Number of Residential/Public Water Supply Wells Monitored During Withdrawal Testing	30	26
Magnitude of Impact on Private Residential Wells During Withdrawal Testing	<p>165 Old Turnpike Road – 36 ft 181 Old Turnpike Rd – 19 ft 187 Old Turnpike Rd – 13 ft 166 Old Turnpike Rd – 13 ft 162 Old Turnpike Road – 10 ft 19 Lincoln Drive – 7 feet 17 Lincoln Drive – 7 feet 164 Old Turnpike Road – 7 ft 5 Lincoln Drive – 7 ft 18 Lincoln Drive – 7 ft 14 Lincoln Drive – 7 feet 15 Lincoln Drive – 7 ft 9 Lincoln Drive – 7 ft 3 Lincoln Drive – 6 ft 10 Lincoln Drive – 6 ft 158 Old Turnpike Road – 6 ft 186 Old Turnpike Rd – 4 ft</p> <p>17 out of 30 (57%) wells influenced</p>	<p>138 Winnicut - 1.5 ft 69 Winnicut – 1 ft</p> <p>2 out of 26 (8%) wells influenced during withdrawal testing</p>

Appendix 1 (continued): Comparison of the USA Springs' Proposed Large Withdrawal Versus
GCNE

App

	USA Springs	GCNE
Extrapolated 180 day drawdown attributable to large withdrawals	165 Old Turnpike Rd - 63 ft 181 Old Turnpike Rd - 55 ft 187 Old Turnpike Rd - 41 ft 166 Old Turnpike Rd - 30 ft 162 Old Turnpike Road - 27 ft 164 Old Turnpike Road - 25 ft 10 Lincoln Drive - 17 ft 18 Lincoln Drive - 17 ft 9 Lincoln Drive - 17 ft 14 Lincoln Drive - 16 ft 3 Lincoln Drive - 16 ft 19 Lincoln Drive - 15 ft 17 Lincoln Drive - 15 ft 5 Lincoln Drive - 15 ft 15 Lincoln Drive - 15 ft 158 Old Turnpike Road - 14 ft 186 Old Turnpike Rd - 14 ft	138 Winnicut - 17 ft 69 Winnicut - 7 ft
Maximum Distance from Pumping Well that Drawdown Was Detected	<p>>4000 feet -</p> <p>Well at 187 Old Turnpike Road exhibited an estimated drawdown of 13 feet during withdrawal testing. USA Springs estimates in its September 11th submittal that 1 foot of drawdown may occur at a distance of 6000-7000 feet from the proposed pumping well. Note the monitoring network did not extend this far out to confirm USA Springs' assessment</p>	2100 feet
Withdrawal test included a sufficient monitoring network to monitor the zone of influence	No	Yes
Requested or Actual Permitted Production Volume	309,600 gallons per day - requested	265,000 gallons per day - permitted

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Appendix 2: Comparison of the USA Springs' February 4, 2003 Final Report - Proposed Monitoring, Reporting, and Mitigation Program Versus GCNE Large Groundwater Withdrawal Permit

	GCNE	USA Springs Proposal Prior to the August 12, 2003 Final Decision Deadline	USA Springs Proposal After the August 12, 2003 Final Decision Deadline
Number of observation points to monitor water levels	67	10 - Proposed	>45 (for some locations, USA Springs may establish more than one monitoring point – this would have been determined when establishing the actual monitoring points)
Number of Wetland Monitoring Plots	Eight Wetland Plots	Not Specified	Eight Wetland Plots
Mitigation measures proposed	Detailed mitigation measures proposed based on water levels, precipitation trends, and qualitative and quantitative analysis of wetland impacts	None	Detailed mitigation measures proposed based on water levels, precipitation trends, and qualitative and quantitative analysis of wetland impacts.

Appendix 3 (continued): Summary of Locations with Groundwater Contamination Exceeding Regulatory Standards within the Area of Drawdown Caused By USA Springs Proposed Groundwater Withdrawal

Observation Point	Approximate Distance to Nearest USA Springs' Proposed Production Well	Location of Observation Point	Regulated Contaminant	Concentration (microgram/liter)	Ambient Groundwater Quality Standard (microgram/liter)	Safe Drinking Water Act Maximum Contaminant Level (microgram/liter)
GW-23	760 feet	Overburden	1,1,1-Trichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Tetrachloroethene	210 300 9 16	200 81 7 5	200 Not Applicable 7 5
MWOW-4	800 feet	Overburden	1,1,1-Trichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Tetrachloroethene	330 460 210 52	200 81 7 5	200 Not Applicable 7 5
GW-3	870 feet	Overburden	1,1,1-Trichloroethane 1,1-Dichloroethene Tetrachloroethene	560 14 20	200 7 5	200 7 5
DW-2	900 feet	Deep Bedrock	1,1-Dichloroethane 1,1-Dichloroethene Tetrachloroethene	260 250 65	81 7 5	Not Applicable 7 5

Appendix 3 (continued): Summary of Locations with Groundwater Contamination Exceeding Regulatory Standards within the Area of Drawdown Caused By USA Springs Proposed Groundwater Withdrawal

Observation Point	Approximate Distance to Nearest USA Springs' Proposed Production Well	Location of Observation Point	Regulated Contaminant	Concentration (microgram/liter)	Ambient Groundwater Quality Standard (microgram/liter)	Safe Drinking Water Act Maximum Contaminant Level (microgram/liter)
MW03-3	925 feet	Overburden	1,1,1-Trichloroethane 1,1-Dichloroethene Tetrachloroethene	480 26 20	200 7 5	200 7 5
MW03-4	1050 feet	Overburden	1,1-Dichloroethane	82	81	81

STATE OF NEW HAMPSHIRE
INTER-DEPARTMENT COMMUNICATION
PRIVILEGED AND CONFIDENTIAL

DATE: April 17, 2002

RECEIVED
APR 18 2002
DEPARTMENT OF
ENVIRONMENTAL SERVICES

FROM: Richard W. Head, Attorney *[Signature]* AT (OFFICE) Department of Justice
SUBJECT: Informal Opinion, Impact of NAFTA and WTO on USA Springs Water Withdrawal Permit Application
TO: Harry Stewart, P.E., Director, Water Division

You have asked for my advice on whether restrictions contained in the North American Free Trade Agreement ("NAFTA") or agreements by the World Trade Organization ("WTO") will prevent the New Hampshire Department of Environmental Services ("NHDES") from suspending, revoking or modifying a water withdrawal permit if the permittee subsequently exceeds New Hampshire environmental standards. USA Springs, Inc. ("USA Springs") has applied for a permit to withdraw up to 439,200 gallons of water per day from property located in Nottingham, New Hampshire. Under the facts as presented, NAFTA and WTO agreements should not affect NHDES's ability to withdraw such a permit if necessary to protect New Hampshire's waters.

FACTUAL BACKGROUND

USA Springs has applied for a permit to withdraw a large volume of groundwater to produce bottled water for sale overseas. Under New Hampshire law, one of the criteria that the applicant must demonstrate is that there will be no adverse impacts to surrounding water resources as a result of operations under a large groundwater withdrawal permit. If adverse impacts are observed to surrounding water resources after a permit is issued, the permittee must reduce the production volume (which includes cessation of production) or take other steps to mitigate adverse impacts.

During a public hearing on the application, a member of the public raised a concern about whether NAFTA or WTO agreements would prohibit NHDES from requiring the permittee from reducing or ceasing production.

ANALYSIS

A. PRODUCTION PROCESS METHOD RESTRICTIONS

Both the WTO agreements and the NAFTA include provisions that effectively prohibit one country from restricting trade in goods based on another country's production process methods ("PPMs"). PPM restrictions are generally defined as restrictions on the trade of a product based on the production process utilized to produce the product. This is differentiated from restrictions based on harm caused by the product itself.

On October 30, 1947, various nations, including the United States, signed the General Agreement on Tariffs and Trade ("GATT"). Article XX of the GATT gave nations the authority to enforce certain health and environmental based restrictions on trade, provided "that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries." As a result of a 1995 meeting of GATT member nations in Marrakesh, Morocco, the WTO was formed to succeed the GATT. Many of the provisions of the GATT, including Article XX, have been incorporated into the WTO Agreement.

In 1991, pursuant to the GATT, Mexico asked the Dispute Settlement body to establish a Panel to decide the legality of a U.S. embargo on tuna that did not meet dolphin protection standards established under U.S. law (the "Tuna-Dolphin Dispute"). The Panel ruled that the U.S. could not embargo imports of tuna from Mexico based on the manner in which tuna was produced in Mexico. The Panel differentiated between an embargo that was based on production methods versus an embargo based on the quality or content of the product itself. The restrictions that give rise to the Panel's opinion have become popularly known as PPM restrictions.

The United States, Mexico and Canada entered negotiations in 1990 to create a "free trade zone" on the North American continent through the phased elimination or reduction of both tariff and non-tariff barriers to trade. Following extensive negotiations, the North American Free Trade Agreement ("NAFTA") was completed and signed by the leaders of the three countries on December 17, 1992.

The NAFTA has incorporated a PPM restriction provision in Chapter 9, Article 904.4. As with the GATT, Chapter 9 of NAFTA does not permit the extraterritorial environmental impact of PPMs to justify PPM based trade restrictions. PPM based import restrictions are allowed only when the PPM standard is based on an assessment of risks created by the product itself.

In summary, an importing country may protect its own environment as it deems necessary, but it cannot impose trade restrictions based on the way the exporting country treats its domestic environment. Because nothing in the facts presented in the USA Springs application give rise to a restriction on a foreign country's PPM's, it is my opinion that the proposed permit restriction will not violate the PPM provisions of WTO agreements or the NAFTA.

B. NATIONAL TREATMENT OF GOODS

Both the GATT (Article III) and the NAFTA (Chapter 3, Article 301 and Chapter 11, Article 1102) include similar provisions prohibiting discrimination of a product based on a product's country of origin. Under the national treatment of goods provisions, one country is unable to regulate a product in a manner that would favor its own private sector. Article III of the GATT states in relevant part as follows:

4. The products of the territory of any contracting party imported into the territory of any other contracting party shall be accorded treatment no less favourable than that accorded to like products of national origin in respect of all laws, regulations and requirement affecting their internal sale, offering for sale, purchase, transportation distribution or use.

Article 1102 of the NAFTA requires that foreign investors and investments in a NAFTA signatory country must be given no less favorable treatment than a domestic investor in like circumstances. "No

For various reasons, both political and environmental in nature, an operation permit was not issued to Metalclad, and the landfill never opened for business.

The Tribunal found that the investors had justifiably relied on the government's representations regarding the status of Metalclad's permit and the government was aware that the landfill was under construction. The Tribunal concluded that "these measures, taken together with the representations of the Mexican federal government, on which Metalclad relied, and the absence of a timely, orderly or substantive basis for denial by the Municipality of the local construction permit, amount to an indirect expropriation." Unfortunately, the Tribunal did not provide any legal analysis to support its decision. The Tribunal did find, however, that the decision was not inconsistent with NAFTA Article 1114 (Environmental Matters) because Metalclad had been advised by federal officials that all required permits for the landfill had been received. This argument is consistent with the theory of equitable estoppel under New Hampshire law.

In *Pope & Talbot, Inc. v. The Government of Canada* (6/26/00) at issue was a Softwood Lumber Agreement ("SLA") between the United States and Canada. The SLA established restrictions on the free export of softwood lumber manufactured in Canada and exported into the U.S. Under the SLA, a fee was to be collected for exports of softwood lumber to the U.S. for exports in excess of the Established Base ("EB") of exports in a given year. Exports at or below the EB were not subject to the fee. There was a graduated fee for exports in excess of the EB. Pope & Talbot, a lumber exporter, claimed that the imposition of a fee was an expropriation of its investment interest in Canadian lumber.

The Tribunal in *Pope & Talbot* included a legal analysis that may provide guidance with interpreting the expropriation provision of the NAFTA. Canada argued to the Tribunal that the regulation at issue was a valid exercise of Canada's police powers, and Article 1110 did not apply to nondiscriminatory regulations. The Tribunal held that Canada's interpretation was too narrow. Citing the *Restatement (Third) of Foreign Relation Law* §712, comment g, the Tribunal concluded that the expropriation provision:

applies not only to avowed expropriations in which the government formally takes title to property, but also to other actions of the government that have the effect of "taking" the property in whole or in large part, outright or in stages ("creeping expropriation"). A state is responsible as for an expropriation of property . . . when it subjects alien property to taxation, regulation, or other action that is confiscatory, or that prevents, unreasonably interferes with, or unduly delays, effective enjoyment of an alien's property or its removal from the state's territory.

After deciding that Article 1110 applied to regulations promulgated pursuant to the state's police powers, the Tribunal next evaluated whether the SLA amounted to a taking of the lumber company's investment interest in Canadian lumber. Utilizing both the *Draft Convention on the International Responsibility of States for Injuries to Aliens* (the "Harvard Draft") and the *Restatement (Third) of Foreign Relation Law*, the Tribunal described an expropriation or taking as follows:

While it may sometimes be uncertain whether a particular interference with business activities amounts to an expropriation, the test is whether that interference is sufficiently restrictive to support a conclusion that the property has been "taken" from the owner. Thus, the *Harvard Draft* defines the standard as requiring interference that would "justify an inference that the owner . . . will not be able to use, enjoy, or dispose of the property . . ." The *Restatement*, in

Appendix 3
New Hampshire Department of Environmental Services Letter Dated April 11, 2003



State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

6 Hazen Drive, P.O. Box 95, Concord, NH 03302-0095
(603) 271-3503 FAX (603) 271-5171



April 11, 2003

Manu Sharma
Principal
Gradient Corporation
238 Main Street
Cambridge, Massachusetts 02142

Subject: USA Springs – Final Permit Application Report Dated February 4, 2003

Dear Mr. Sharma:

The New Hampshire Department of Environmental Services (DES) has reviewed the document titled "Large Groundwater Withdrawal Report – Proposed USA Springs Bottling Plant" (report) dated February 3, 2003 and received on February 4, 2003. This document was submitted by you, on behalf of USA Springs, Incorporated (USA Springs), in order to fulfill the requirements of New Hampshire Administrative Rules Env-Ws 388-Major Large Groundwater Withdrawals and Env-Ws 389-Groundwater Sources of Bottled Water to obtain approval to withdrawal up to 310,000 gallons of groundwater a day for the purpose of bottling water.

The purpose of this letter is to provide USA Springs with preliminary comments on the report relative to the requirements of Env-Ws 388 and 389. As an attachment to this letter, DES has provided technical comments regarding the report. Please note that no comments are provided pertaining to issues related to groundwater contamination and the ongoing investigation at the adjacent K&B Realty site. Consistent with the time extension granted by DES, it is anticipated that supplemental information or analysis concerning any contamination source(s) will be provided after additional information is available.

Should you have any questions, please do not hesitate to contact the undersigned below.

Sincerely,

COPY
Brandon Kernan, P.G.
Hydrologist
Water Supply Engineering Bureau

COPY
Anthony P. Giunta, P.G.
Administrator
Water Supply Engineering Bureau

Enclosure

cc: F. Rotondo, USA Springs
G. Smith, Esquire
R. Head, NHDOJ
S. Pillsbury, DES
H. Stewart, DES
R. Monaco, DES

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**Preliminary Technical Comments of the
New Hampshire Department of Environmental Services – April 11, 2003
USA Springs Final Permit Application Report Dated February 4, 2003**

1.0 Conceptual Model

Env-Ws 388 and Env-Ws 389 both require the development, refinement, and presentation of a conceptual hydrogeologic model. The following comments are provided in this context:

- 1) *180-day Recharge Period*: Executive Summary, page i (paragraph 1) states: *"in particular, this rate can be sustained even if there were no contribution to groundwater from precipitation at all for six months, an event which almost never occurs in New Hampshire"*. This and other similar phrases in the report need to be revised to reflect typical natural conditions. In New Hampshire, water levels in all types of aquifers typically decline every year from the month of May through the month of October, because very little precipitation replenishes aquifers during this period (see data collected by the United States Geological Survey at <http://nh.water.usgs.gov/Publications/annual01/A8.gwlevels.pdf>). The rate of decline varies, being greater during periods of drought and less during wet weather periods. As discussed below, in addition to changing the report language, the conceptual model needs to be fully calibrated to this 180-day no recharge period as required in Env-Ws 388.
- 2) *Aquifer Storage/Source of Pumped Water*: Executive Summary, page ii (paragraph 3), page 27 (paragraph 2) states: *"Furthermore, although water available within storage will not be tapped due to the net water surplus..."*. Data from the report indicates that pumped water will be derived from both "recharge" and "storage" under virtually all conditions. During some time periods, such as the wet weather period when the withdrawal test occurred, the dominant source may be recharge with less pumped from storage than during "normal" conditions. However, the report data indicate that the withdrawal test created a zone of influence (Figures 3-16, 3-17, and 3-18) and thus storage was evidently being tapped to some degree even under the November 2002 withdrawal test conditions, which were relatively wet. The report language should be revised to better reflect this storage/recharge relationship.
- 3) *Potentially Conflicting Elements of the Conceptual Model*: The conceptual model describing the relationship between recharge in the shallow overburden and the bedrock aquifer needs to be more fully reconciled with the available data, and consistently developed and integrated. The report presents two conflicting conceptual models: (1) bedrock is vertically isolated from the surficial overburden and (2) bedrock is rapidly recharged by precipitation events so groundwater is not removed from local storage (i.e., bedrock wells are closely connected to the shallow overburden aquifer). Please correct the conflicting conceptual models or provide a technical basis to explain the apparent conflict. Statements that reflect the conflict within conceptual models are presented below:

Statements consistent with bedrock isolation from surficial overburden

- On page 28, (paragraph 3), the report states *"minimal response was noted in the shallow overburden deposits during the withdrawal test"*.
- On page 32- 33, the report suggests that bedrock is insulated or *"vertically isolated"* from events that occur on the surface that might cause contamination of the bedrock aquifer.

- If you believe that no data corrections are necessary, please provide a technical explanation for this conclusion.
- 2) The following tables in the report need to be revised to correct for precipitation and pipe leakage that occurred prior to and during withdrawal testing to meet the requirements of Env-Ws 379.15 as required by Env-Ws 388 and 389: Table 3-8, Table 4-1, Table 4-2 (section 2). If you do not believe any correction is necessary, please provide a technical basis for your conclusion.
 - 3) The following figures in the report need to be revised to correct for precipitation and pipe leakage that occurred prior to and during withdrawal testing to meet the requirements of Env-Ws 379.11(e)(8)/Env-Ws 379.15: Figure 3-13, Figure 3-14, Figure 3-15, Figure 3-16, Figure 3-17, Figure 3-18, and Figure 3-19. The report should provide a summary table of water levels at the end of the pumping period. End-of-test figures analogous to Figures 3-13, 3-14, 3-16 and 3-18 should also be provided. If you do not believe any correction is necessary, please provide a technical basis for your conclusion.
 - 4) Env-Ws 379.11(e)(8) requires that water level data be presented in tabular form. The table(s) must include appropriate corrections to the groundwater levels. In addition to data corrections for precipitation effects, because many of the wells monitored during the withdrawal test are constructed in semi-confined aquifers, correction for barometric efficiency is also appropriate. Further, depending upon the types of transducers used, barometric pressure variation effects on water level instrument reading may also be necessary if the pressure transducers were not vented. Both recorded and corrected water levels are to be plotted versus time, as spelled out in detail in Env-Ws 379.11(e)(8)c. If you do not believe any correction is necessary, please provide a technical basis for your conclusion.
 - 5) Env-Ws 379.11(e)(8) requires a table providing the horizontal distances between observation points and the pumping well(s). This has not been provided. The same regulation requires that drawdown be plotted versus the log of distance. This has not been included in the report and should be added for selected well profiles, especially west of the pumping wells. The plots should use measurements corrected for precipitation and other effects as described above. Both end-of-pumping test results and 180-day results should be considered.
 - 6) The zone of influence that has been delineated in Figure 3-13 and the wellhead protection area delineated in Figure 3-15 need to be revised. There does not appear to be a basis, or the basis is not clear, for the extent of the zone of influence provided in the report relative to all orientations of the site and the network of wells monitored during the withdrawal test. The network of wells did not extend in the northern, western, or southern direction of the site to a distance where no response to pumping was observed. As discussed above, analytical methods that establish a distance-drawdown relationship in preferential flow direction to the USA Springs pumping wells must be developed and applied to delineate the zone of influence. It is likely that the wellhead protection area presented in the report, that must be delineated in accordance with Env-Ws 389.15 (which references Env-Ws 379.17), will need to be expanded to the west. Note that outcrop #4 (Figure 3-1), located along Route 4 west of the site has approximately east-west fracturing.
 - 7) Please provide comment and justification for the construction and method of monitoring flow in the Unnamed Creek located north of the site. DES is concerned that the construction and monitoring methodology may have produced erroneous stream discharge estimates during the high flow

- g) Explain why the wetlands leakage analysis (pages 38–40 and Table 4-2) was not corrected to dry weather conditions from the relatively high flows and surface water levels that existed during the withdrawal test.
- 7) The report provides a description of the soils underlying the on-site beaver pond on page 22. However, with the exception of the boring log associated with the installation of monitoring point DP-1S which did not directly assess the properties of the soils underlying the wetland, no detailed information is provided regarding the subsurface investigation conducted by the certified wetland scientist. This information is required to determine the basis for the conclusion that *“the pond bottom reduces the degree of hydraulic communication between the Beaver Pond and underlying aquifer.”*
- 8) The report’s conclusion that the leakage rate will be reduced by 0.16 cu. ft./min on page 38 may be simplistic. Based on the calculations provided, there is not just a reduction in upward leakage but an elimination of the upward vertical gradient that might drive groundwater discharge to the wetland under non-pumping conditions. If this is the case, pumping the USA Springs wells may cause groundwater discharge to the wetlands to cease even under the relatively high water conditions prevalent during the pumping test.
- 9) The analyses on page 38 of the report explains *“the loss in the wetland leakage rate (0.16 ft³/min) is only 0.15% to approximately 1% of the stream flow observed in the Unnamed Creek during the withdrawal test (13.7 to 109.6 ft³/min)”*. On page 39 of the report, it is explained that leakage rate analysis suggests that only 3% of the pond volume will be reduced due to pumping if it did not rain for 2 months. This analysis does not take into account the recharge issues raised above. For the reasons described above, please correct for precipitation recharge in your analysis. If you do not believe any correction is necessary, please provide a technical basis for your conclusion.

On page 40 of the report, it is concluded that *“both the large flow volume in the Unnamed Creek and the large storage of the pond are expected to minimize any potential effect of the proposed withdrawal on the wetland system and pond.”* The conclusion that pond storage will help minimize pumping effects implies that USA Springs believes that infiltration of water from the pond may occur during pumping. The report does not discuss the effect that pumping the wells during a time of reduced (or even zero) flows in the Unnamed Creek would have on the amount of water in the pond. If stream flow were reduced or eliminated, and if groundwater discharge to the wetland ceased, the pond would lose storage due to evaporation, surface water outflow, and possible infiltration into the ground under pumping stress. These potential wetland effects are not assessed in the report. The water budget also does not incorporate the loss of water to evapotranspiration, as well as the issues described in Comments 6-8, above.

- 10) The following statement is made on page 39 of the report: *“The use of the water level measured during the test within the Pond prior to the test to calculate leakage under 180-day no-recharge conditions is conservative since during such conditions the Pond level is likely to be somewhat lower, hence resulting in a smaller gradient and a smaller leakage rate”*. This analysis does not appear to take into account several factors. Whether the pond is contributing water to, or receiving water from, groundwater is dependant on seasonal conditions. During periods of low recharge and the vegetative growing season, it is likely that the water level of the underlying deposits will also be lower, meaning that the vertical gradient could actually be larger and reversed in the downward direction under low-flow conditions. The water level used to calculate the vertical gradient between the pond and the overburden aquifer does not account for this, because it has not been corrected for the effects of

precipitation. Also, lower surface water case, possibly more water in the wetland

11) Selected surface water (H. This graph shows interior) are greater upward head gradient groundwater and surface water. Thus, the upward gradient. One possible interpretation pumping wells from eliminated, induced hydrogeologic recharge possibility and the conclusion explain your analysis

12) The information presented no response noted in Wetlands #39 and B wetlands located within corrects for precipitation as defined in the rule technical basis for the to make the conclusion *the Study Area.* Since conditions for those preferential drawdown showed a slight response discussed and considered

13) Appendix D – This

- a) Table 1 which
- b) A revision of the the requirements
- c) A figure showing
- d) A summary of

g) Explain why the wetlands leakage analysis (pages 38–40 and Table 4-2) was not weather conditions from the relatively high flows and surface water levels than withdrawal test.

7) The report provides a description of the soils underlying the on-site beaver pond. However, with the exception of the boring log associated with the installation of DP-1S which did not directly assess the properties of the soils underlying the wetland, information is provided regarding the subsurface investigation conducted by the geoscientist. This information is required to determine the basis for the conclusion that *reduces the degree of hydraulic communication between the Beaver Pond and the*

8) The report's conclusion that the leakage rate will be reduced by 0.16 cu. ft./min is simplistic. Based on the calculations provided, there is not just a reduction in upward elimination of the upward vertical gradient that might drive groundwater discharge under non-pumping conditions. If this is the case, pumping the USA Springs well groundwater discharge to the wetlands to cease even under the relatively high water prevalent during the pumping test.

9) The analyses on page 38 of the report explains "*the loss in the wetland leakage rate only 0.15% to approximately 1% of the stream flow observed in the Unnamed Creek withdrawal test (13.7 to 109.6 ft³/min)*". On page 39 of the report, it is explained analysis suggests that only 3% of the pond volume will be reduced due to pumping for 2 months. This analysis does not take into account the recharge issues raised reasons described above, please correct for precipitation recharge in your analysis. believe any correction is necessary, please provide a technical basis for your conclusion

On page 40 of the report, it is concluded that "*both the large flow volume in the Unnamed Creek and the large storage of the pond are expected to minimize any potential effect of the withdrawal on the wetland system and pond.*" The conclusion that pond storage and pumping effects implies that USA Springs believes that infiltration of water from the pond during pumping. The report does not discuss the effect that pumping the wells due reduced (or even zero) flows in the Unnamed Creek would have on the amount of water. If stream flow were reduced or eliminated, and if groundwater discharge to the wetland pond would lose storage due to evaporation, surface water outflow, and possible infiltration ground under pumping stress. These potential wetland effects are not assessed in the water budget also does not incorporate the loss of water to evapotranspiration, as described in Comments 6-8, above.

10) The following statement is made on page 39 of the report: "*The use of the water level during the test within the Pond prior to the test to calculate leakage under 180-day conditions is conservative since during such conditions the Pond level is likely to be high hence resulting in a smaller gradient and a smaller leakage rate*". This analysis does not take into account several factors. Whether the pond is contributing water to, or receiving groundwater is dependant on seasonal conditions. During periods of low recharge during the growing season, it is likely that the water level of the underlying deposits will also be high that the vertical gradient could actually be larger and reversed in the downward flow conditions. The water level used to calculate the vertical gradient between the pond and overburden aquifer does not account for this, because it has not been corrected for

4.0 Effects on Current Water Users

- 1) All analyses presented in the report must be revised as described in Section 1 of this document. All graphs depicting water level measurements should be constructed on an appropriate (i.e., small) scale so that subtle trends can be reasonably identified.
- 2) The dewatering of the water column by a factor of only 10% (page 35) may result in the dewatering of a primary water bearing fracture that supplies water to the well, and, as a result, an alternative water supply may have to be provided to these water users.
- 3) Simply lowering a pump intake of a well as described on page 35 to mitigate an impact may not be adequate. Loss in head within the water column of the well casing may cause a well pump to fail, and a new more powerful pump may need to be installed to off-set head losses caused by the pumping at USA Springs.
- 4) The report states "*there is no current evidence that suggests that adverse impacts will occur, similar minor mitigation steps (i.e. – lowering the pump) might be required at very few other private wells*" (page 35). Please identify which area and wells USA Springs is referring to. Because impacts were observed at the edge of the monitoring network in the easterly direction, how will impacts be identified and addressed in accordance with Env-Ws 388.09(a) and (d) or Env-Ws 388.20 (a) and (b)?
- 5) Projected 180-day drawdown results (Table 4-1) show that four of the domestic wells monitored would experience a drawdown greater than or equal to 10% of the available water column under high recharge conditions. All of these wells (Brett and Stephanie Gillespie, Irene Gillespie, James Page, Jr. and John Pierce) are located along Rt. 4 (Old Turnpike Road), west of the USA Springs site (Figure 3-13). The Brett and Stephanie Gillespie well has a projected drawdown of 61 feet, and the Page well shows a projected drawdown of 39 feet and is more than 3000 feet away from the nearest USA Springs pumping well. Additional wells in this vicinity have projected drawdowns that are greater than 5% of the water column. Other wells in the area were not monitored during the test, and some of these may also experience significant drawdowns during USA Springs' pumping.

Of the four wells with greater than 10% projected drawdown, none has a Well Completion Report in Appendix C, and Appendix C contains a questionnaire only for the Pierce well. This questionnaire indicates that a new pump motor was installed in March 2002, but does not provide pump depth or other information. The report asserts (page 35) that "*anticipated depth of pump intakes (is) expected to be ... at sixty to seventy-five percent of the well depth*", but provides no evidence. The report predicts "*no loss of available water to the users of these wells.*" Based on the data presented, this assertion has not been justified.

5.0 Water Quality

- 1) Report Page 12, Section 3.2.5: Significant findings regarding the results of the Pre-Withdrawal Test Water Quality Monitoring should be described. For example, Radium 226+228 exceeded drinking water standards set forth by Env-Ws 315.60 in the sampling conducted in October 2002, but is well below these standards in samples collected in November 2002. These results should be assessed to determine if groundwater derived from USA-1, USA-2 and USA-4 will require treatment to continuously meet safe drinking water standards to meet the objectives of Env-Ws 389.11(b).

Appendix 5
Department of Justice Informal Opinion on Issues Pertaining to International Trade

STATE OF NEW HAMPSHIRE
INTER-DEPARTMENT COMMUNICATION
PRIVILEGED AND CONFIDENTIAL

DATE: April 17, 2002

RECEIVED
APR 18 2002
DEPARTMENT OF
ENVIRONMENTAL SERVICES

FROM: Richard W. Head
Attorney

AT (OFFICE) Department of Justice

SUBJECT: Informal Opinion, Impact of NAFTA and WTO on USA Springs Water Withdrawal Permit Application

TO: Harry Stewart, P.E., Director, Water Division

You have asked for my advice on whether restrictions contained in the North American Free Trade Agreement ("NAFTA") or agreements by the World Trade Organization ("WTO") will prevent the New Hampshire Department of Environmental Services ("NHDES") from suspending, revoking or modifying a water withdrawal permit if the permittee subsequently exceeds New Hampshire environmental standards. USA Springs, Inc. ("USA Springs") has applied for a permit to withdraw up to 439,200 gallons of water per day from property located in Nottingham, New Hampshire. Under the facts as presented, NAFTA and WTO agreements should not affect NHDES's ability to withdraw such a permit if necessary to protect New Hampshire's waters.

FACTUAL BACKGROUND

USA Springs has applied for a permit to withdraw a large volume of groundwater to produce bottled water for sale overseas. Under New Hampshire law, one of the criteria that the applicant must demonstrate is that there will be no adverse impacts to surrounding water resources as a result of operations under a large groundwater withdrawal permit. If adverse impacts are observed to surrounding water resources after a permit is issued, the permittee must reduce the production volume (which includes cessation of production) or take other steps to mitigate adverse impacts.

During a public hearing on the application, a member of the public raised a concern about whether NAFTA or WTO agreements would prohibit NHDES from requiring the permittee from reducing or ceasing production.

ANALYSIS

A. PRODUCTION PROCESS METHOD RESTRICTIONS

Both the WTO agreements and the NAFTA include provisions that effectively prohibit one country from restricting trade in goods based on another country's production process methods ("PPMs"). PPM restrictions are generally defined as restrictions on the trade of a product based on the production process utilized to produce the product. This is differentiated from restrictions based on harm caused by the product itself.

On October 30, 1947, various nations, including the United States, signed the General Agreement on Tariffs and Trade ("GATT"). Article XX of the GATT gave nations the authority to enforce certain health and environmental based restrictions on trade, provided "that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries." As a result of a 1995 meeting of GATT member nations in Marrakesh, Morocco, the WTO was formed to succeed the GATT. Many of the provisions of the GATT, including Article XX, have been incorporated into the WTO Agreement.

In 1991, pursuant to the GATT, Mexico asked the Dispute Settlement body to establish a Panel to decide the legality of a U.S. embargo on tuna that did not meet dolphin protection standards established under U.S. law (the "Tuna-Dolphin Dispute"). The Panel ruled that the U.S. could not embargo imports of tuna from Mexico based on the manner in which tuna was produced in Mexico. The Panel differentiated between an embargo that was based on production methods versus an embargo based on the quality or content of the product itself. The restrictions that give rise to the Panel's opinion have become popularly known as PPM restrictions.

The United States, Mexico and Canada entered negotiations in 1990 to create a "free trade zone" on the North American continent through the phased elimination or reduction of both tariff and non-tariff barriers to trade. Following extensive negotiations, the North American Free Trade Agreement ("NAFTA") was completed and signed by the leaders of the three countries on December 17, 1992.

The NAFTA has incorporated a PPM restriction provision in Chapter 9, Article 904.4. As with the GATT, Chapter 9 of NAFTA does not permit the extraterritorial environmental impact of PPMs to justify PPM based trade restrictions. PPM based import restrictions are allowed only when the PPM standard is based on an assessment of risks created by the product itself.

In summary, an importing country may protect its own environment as it deems necessary, but it cannot impose trade restrictions based on the way the exporting country treats its domestic environment. Because nothing in the facts presented in the USA Springs application give rise to a restriction on a foreign country's PPM's, it is my opinion that the proposed permit restriction will not violate the PPM provisions of WTO agreements or the NAFTA.

B. NATIONAL TREATMENT OF GOODS

Both the GATT (Article III) and the NAFTA (Chapter 3, Article 301 and Chapter 11, Article 1102) include similar provisions prohibiting discrimination of a product based on a product's country of origin. Under the national treatment of goods provisions, one country is unable to regulate a product in a manner that would favor its own private sector. Article III of the GATT states in relevant part as follows:

4. The products of the territory of any contracting party imported into the territory of any other contracting party shall be accorded treatment no less favourable than that accorded to like products of national origin in respect of all laws, regulations and requirement affecting their internal sale, offering for sale, purchase, transportation distribution or use.

Article 1102 of the NAFTA requires that foreign investors and investments in a NAFTA signatory country must be given no less favorable treatment than a domestic investor in like circumstances. "No

For various reasons, both political and environmental in nature, an operation permit was not issued to Metalclad, and the landfill never opened for business.

The Tribunal found that the investors had justifiably relied on the government's representations regarding the status of Metalclad's permit and the government was aware that the landfill was under construction. The Tribunal concluded that "these measures, taken together with the representations of the Mexican federal government, on which Metalclad relied, and the absence of a timely, orderly or substantive basis for denial by the Municipality of the local construction permit, amount to an indirect expropriation." Unfortunately, the Tribunal did not provide any legal analysis to support its decision. The Tribunal did find, however, that the decision was not inconsistent with NAFTA Article 1114 (Environmental Matters) because Metalclad had been advised by federal officials that all required permits for the landfill had been received. This argument is consistent with the theory of equitable estoppel under New Hampshire law.

In *Pope & Talbot, Inc. v. The Government of Canada* (6/26/00) at issue was a Softwood Lumber Agreement ("SLA") between the United States and Canada. The SLA established restrictions on the free export of softwood lumber manufactured in Canada and exported into the U.S. Under the SLA, a fee was to be collected for exports of softwood lumber to the U.S. for exports in excess of the Established Base ("EB") of exports in a given year. Exports at or below the EB were not subject to the fee. There was a graduated fee for exports in excess of the EB. Pope & Talbot, a lumber exporter, claimed that the imposition of a fee was an expropriation of its investment interest in Canadian lumber.

The Tribunal in *Pope & Talbot* included a legal analysis that may provide guidance with interpreting the expropriation provision of the NAFTA. Canada argued to the Tribunal that the regulation at issue was a valid exercise of Canada's police powers, and Article 1110 did not apply to nondiscriminatory regulations. The Tribunal held that Canada's interpretation was too narrow. Citing the *Restatement (Third) of Foreign Relation Law* §712, comment g, the Tribunal concluded that the expropriation provision:

applies not only to avowed expropriations in which the government formally takes title to property, but also to other actions of the government that have the effect of "taking" the property in whole or in large part, outright or in stages ("creeping expropriation"). A state is responsible as for an expropriation of property . . . when it subjects alien property to taxation, regulation, or other action that is confiscatory, or that prevents, unreasonably interferes with, or unduly delays, effective enjoyment of an alien's property or its removal from the state's territory.

After deciding that Article 1110 applied to regulations promulgated pursuant to the state's police powers, the Tribunal next evaluated whether the SLA amounted to a taking of the lumber company's investment interest in Canadian lumber. Utilizing both the *Draft Convention on the International Responsibility of States for Injuries to Aliens* (the "Harvard Draft") and the *Restatement (Third) of Foreign Relation Law*, the Tribunal described an expropriation or taking as follows:

While it may sometimes be uncertain whether a particular interference with business activities amounts to an expropriation, the test is whether that interference is sufficiently restrictive to support a conclusion that the property has been "taken" from the owner. Thus, the *Harvard Draft* defines the standard as requiring interference that would "justify an inference that the owner . . . will not be able to use, enjoy, or dispose of the property . . ." The *Restatement*, in

